

Southern Pacific Company
(PACIFIC SYSTEM)

RULES AND REGULATIONS

OPERATING DEPARTMENT

Revised Edition

JANUARY 1, 1898

No. 4927

THIS BOOK

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SOUTHERN PACIFIC CO.

(PACIFIC SYSTEM.)

RULES  REGULATIONS

FOR THE

GOVERNMENT OF EMPLOYÉS

OF THE

OPERATING DEPARTMENT.

REVISED EDITION.

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RULES ^{AND} REGULATIONS

FOR THE

GOVERNMENT OF EMPLOYÉS

OF THE

OPERATING DEPARTMENT.

REVISED EDITION.

To take effect January 1, 1898,

AT 12:01 A. M.

The rules herein set forth will govern the railroads operated by the Southern Pacific Company (Pacific System), and shall take effect January 1, 1898, superseding all prior rules and instructions inconsistent therewith.

Special instructions may be issued by proper authority.

J. A. FILLMORE,
Manager Pacific System.

R. KOEHLER,
Manager Lines in Oregon.

APPROVED:

J. KRUTTSCHNITT,
General Manager.

GENERAL NOTICE.

To enter, or remain in, the service is an assurance of willingness to obey the rules.

Obedience to the rules is essential to the safety of passengers and employés, and to the protection of property.

Successful service requires the courteous, intelligent, and faithful discharge of duty. To obtain promotion capacity must be shown for increased responsibility.

Employés are advised that, in accepting employment, they assume the accompanying risks, and are expected to look after, and be responsible for, their own safety, as well as to exercise the utmost caution to avoid injury to others.

GENERAL RULES.

1. Employés whose duties are prescribed by these rules must provide themselves with a copy.

2. Special instructions, given by proper authority, must be observed while in force.

3. Employés are required to be conversant with, and obey the rules and special instructions. If in doubt as to their meaning they must apply to the proper authority for an explanation.

4. Employés must pass the required examinations.

5. Persons employed in any service on trains are subject to the rules.

6. Employés, while on duty, must wear the prescribed badge or uniform and be neat in appearance.

7. The use of intoxicants, while on duty, is prohibited. Their habitual use, or the frequenting of places where they are sold, is sufficient cause for dismissal.

8. The use of tobacco by employés when in or about passenger stations, or by passenger trainmen when on duty is prohibited.

9. Persons authorized to transact business at stations or on trains must be required to conduct themselves in a quiet and orderly manner, without annoyance to passengers.

10. In case of danger to the Company's property employés must unite to protect it.

11. Employés must render all the assistance in their power in carrying out the rules and special instructions.

12. Any violation of the rules must be reported.

GENERAL REGULATIONS FOR EMPLOYÉES.

Exclusive
service re-
quired.

51. All employés must devote themselves exclusively to the Company's service, attending to their duties during prescribed hours, residing wherever required, and obeying promptly instructions of executive and general officers, and those of heads of departments, in matters pertaining to their respective branches of the service.

Absence.

52. No employé, whatever may be his rank, will be allowed to absent himself from duty without permission from the head of the department in which he is engaged; nor will he be permitted to engage in other business without the consent of his immediate superior, approved by the General Manager.

Company's
credit.

53. Unless specially authorized, employés must not use the Company's credit and must neither receive nor pay out money on the Company's account.

Use of
Company's
property.

54. Employés will be held responsible for the prudent and economical use of all supplies and material furnished them. Economy, order and cleanliness are enjoined in the care and use of property, tools, material, etc.

Minors.

55. Minors must not be employed in train service without written consent of parents or guardians, which must be filed with personal records.

Sight and
hearing.

56. No person whose sense of hearing, sight, or color perception is defective will be employed in any branch of the service where signals are used.

57. Every employé is required to exercise the utmost caution to avoid injury to himself or to others, especially in the switching or other movement of trains. Warning.

Employés are warned not to attempt to get on the front or rear of an engine, or on the end of a car as it approaches them, or to jump on or off trains and engines in rapid motion, or to go between cars in motion to uncouple them; these and all similar imprudent acts are forbidden.

58. Enginemen must exercise great care in handling their engines while yardmen or others are making couplings, and must give close attention to signals. Conductors and yardmen must report to the Superintendent any enginemen who disregard this order. Caution in
coupling.

59. Great care must be exercised by all persons when coupling cars. Inasmuch as the couplers of cars and engines cannot be uniform in style, or strength, and are liable to be broken from various causes, so as to render it dangerous to expose the hands, arms, or persons of those engaged in making couplings, all employés are **enjoined** before coupling cars or engines, to **examine** and to **know** the kind and condition of the drawhead, drawbar, link and coupling apparatus, and are forbidden to place in trains any car with a defective coupling until they shall have reported the defect to the conductor or yardmaster. Sufficient time may be taken by employés in all cases to make the examination required. Condition
of couplers
must be
known.

60. In coupling Miller hooks with other styles of drawbars, the link should first be inserted in the hook, using the pin chained to the Miller platform. Mode of
coupling.

In coupling a Miller hook, with link and pin, to an automatic coupler, the link should first be inserted in the hook, then the coupling be made to the closed knuckle of the automatic coupler.

The person making the coupling should, as a rule, stand on the guard-arm side of the automatic coupler.

When coupling with link and pin, a car having a plain drawhead, to one having an automatic coupler, the link and pin should first be inserted in the closed knuckle of the automatic coupler, then the coupling be made to the plain drawhead.

Three-link drawheads must be connected by the two outside links or the one center link; an outside link must not be used to couple with a single drawhead.

Employés must not remove any appliances from engines or cars for the sake of convenience in switching, thereby endangering those who are required to make couplings.

61. It is dangerous to **assume** that signals given to the engineman or fireman have been seen, or, if seen, that they will be obeyed, when obedience to those signals on the part of the engineman or fireman is essential to the safety of an employé in the performance of his duty. He must **know** that the signal has been seen, understood, and obeyed before placing himself in a dangerous position. Otherwise he assumes all risk of danger arising from any misunderstanding or disregard of signals.

62. Yardmen, trainmen and other employés are directed to report to the Superintendent any defects in the construction of the yard

Avoid misunderstanding of signals.

Defects in yard tracks.

tracks whereby an accident might happen to men in the discharge of their duties.

63. Conductors must give particular attention to the safety and comfort of their passengers, to the heating, lighting and ventilation of cars, and to the supply of water in the tanks.

Brakemen and train porters must assist ladies, children and infirm persons in getting on and off the cars; in their absence conductors will perform this duty.

64. On approaching a station at which the train stops, the conductor or brakeman must pass through each car, except the sleeping-cars, stop twice, and announce each time distinctly, with closed doors, the name of the station. At junction stations the names of the principal stations where connecting trains stop must be announced. If any stop be made before the station announced is reached, notice must be given to passengers in each car. Train conductors will see that employés of sleeping or parlor-cars advise their passengers when they are to leave the train.

At junctions, where trains leave in different directions, the conductor of each train must cause to be announced distinctly in each passenger-car before starting, the direction in which the train is to go, and the principal stations on the route.

65. Conductors will prevent unnecessary noise about passenger trains, particularly at night, and must not allow employés to enter sleeping-cars except when necessary in the discharge of their duties. Care must be used in switching so as to disturb passengers as little as possible.

Safety and comfort of passengers.

Announcing stations.

Preventing noise about passenger trains.

Explosives.

66. No gunpowder, dynamite, nitro-glycerine or similar explosive will be transported in any car attached to a passenger train.

News agents.

67. News agents must wear the designated badge and present a neat personal appearance. Conductors will be held responsible for the proper conduct of news agents while on trains. If they find any objectionable matter offered, it will be their duty to suppress its sale.

News agents will not be permitted on chartered trains.

68. Conductors must not allow beggars, gamblers or unauthorized peddlers to practice their vocations on trains, or advertising matter to be distributed.

Free travel.

69. No person will be allowed to ride free except as specially provided. Conductors must collect fare from all persons traveling without a ticket, being allowed no discretion.

Ejection of passengers.

70. Circumstances under which passengers may be ejected from trains are fully covered below.

The law provides that a railroad company may demand the fare of passengers, either at starting or at any subsequent time. A passenger who refuses to pay his fare, or to conform to any lawful regulation of the carrier, may be ejected from the vehicle by the carrier. But this must be done with as little violence as possible, and at a usual stopping-place or near some dwelling-house. A passenger upon a railroad train who has not paid his fare before entering the train, if he has been afforded an opportunity to do so, must upon demand pay such train rate

in addition to the regular ticket rate as may be provided by the rules of the Passenger Department. A railroad company has a lien upon the luggage of a passenger for the payment of such fare as it is entitled to from him.

In case a person is by reason of any infirmity unable to travel or find his way from the point where he is put off to a dwelling-house or town, or if the weather be so inclement as to render it unsafe or inhuman to eject a person at a point other than a station, then such person should be ejected from the train at a station where suitable accommodations can be procured for his safety and comfort.

Drunken or disorderly persons, or others whose conduct and appearance is such as is calculated to operate as a serious annoyance to other passengers, or a passenger who is guilty of gross misconduct, either by insulting or assaulting other passengers or train employes, who uses vile or profane language in the car, or who threatens to assault other passengers or train employes, may lawfully be expelled from the train at any usual stopping-place, or near a dwelling-house or station, provided the place be not such as to cause want or injury; this may be done whether fare has been paid or not.

Should a passenger be found holding a ticket to a station at which train is not scheduled to stop, conductor must notify such passenger to get off short of destination and wait for proper train.

71. No person will be permitted to ride on an engine, or in baggage, mail or express cars (except employes in the discharge of their duties) without a written order from the Superintendent.

Riding on engines, etc.

Consulting
bulletin
boards.

72. Conductors and enginemen must consult bulletin-boards daily, and always before leaving terminal stations.

Require-
ments of
trainmen.

73. Conductors and trainmen are required to be with their trains at least thirty minutes before the time of departure. Passenger trainmen will remain by their trains at terminals to answer inquiries and assist passengers until the train is emptied.

Inquiring
for orders
and report-
ing trains.

74. Conductors of all trains, and enginemen of light engines, immediately before starting from initial stations and upon arrival at terminals, must go in person to the telegraph office to inquire if any special orders are awaiting them, and at junctions or terminal stations must enter in train-register, and at non-register stations must telegraph to the Superintendent's office, the time of their arrival or departure; and, if their train be an extra, the direction in which it is going, the signals carried, the number of the engine, and all other information called for by the register.

Looking
out for
signals.

75. Conductors and brakemen of all trains when meeting or passing, or when leaving or approaching a station, **must be on the look out** for signals, and be prepared to do anything required for safety or dispatch.

Calling for
and ac-
knowledg-
ing station
signal.

76. Enginemen on approaching stations must sound one long blast of the whistle (as per Rule 339), which must be answered by the operator, if the station be a telegraph station, by a change of his fixed signal from red to white by day, and from a red to a white light by night, if he has no orders for the train. Should the whistle not be

answered in the proper manner by the operator, the engineman must then sound four short blasts of the whistle as a call for signals. In either case the operator's signal must be acknowledged as per Rule 342.

77. All trains must come to a **full stop** before crossing drawbridges, or the track of another railway at grade, and before entering upon the track of another railway, or division (unless the drawbridges, crossings or junction switches are protected by interlocking signals and derailing switches). After sounding one long blast of the whistle they shall not proceed until the proper signal is set, as per rules governing each case. When the signal at any crossing or junction cannot be seen, the engineman will send the fireman ahead, and shall not proceed until the way is known to be clear.

Junctions,
railroad
crossings
and draw-
bridges.

78. When two trains of the same class approach a crossing at the same time, the one nearest the crossing shall be given the preference. If of different class, the superior train shall be given the preference, but the crossing signal, having been once set, shall not be changed until the train to which the signal is given has passed, or proper signals have been sent out a sufficient distance to avoid accident.

Preference
at cross-
ings.

79. Enginemen are required to control their trains with the air-brakes approaching drawbridges, railroad crossings at grade, junction switches, meeting points or limits of established yards, and if unable to do so must signal the brakemen to apply the brakes. Brakemen are required to be at the brake-wheels on approaching such places, ready to apply the brakes by hand in case the air-brakes fail.

Control-
ling speed
of trains.

Approach-
ing sta-
tions and
water-
tanks care-
fully.

80. Extra trains must approach all stations, side tracks, water-tanks and fuel stations with train under full control, expecting to find trains at such points. Speed must be reduced, so that under no circumstances shall it be possible for them to strike any train that may be within the station switches, or that may be taking fuel or water. In such cases the responsibility for accident rests on the approaching train.

Freight
trains in
sections.

81. When freight trains are run in two or more sections the sections must be kept ten minutes apart, except at meeting points, where the following section may close up, but always with great care and with train under perfect control. When fog, darkness, dangerous places or other circumstances render it necessary, the forward train, as an extra precaution, will send out a flagman, **but it must be distinctly understood that this does not relieve the following train from responsibility in case of collision.** By **control** is meant ability to stop within range of vision. See Rules 79 and 80.

Accidents.

82. In case of accident, conductors of passenger trains may command the services of any train, engine, or employé available.

High
water.

83. In case of unusual storm or high water, trains must be brought to a stop and a man sent to examine bridges, trestles, culverts, and other points liable to damage, before passing over.

Reporting
accidents
by wire.

84. All accidents must be reported by wire from the nearest telegraph station to the Superintendent, and a written report must be forwarded to him on the proper form as soon as possible. In making such reports the facts must be fully

stated. Care must be taken to secure the names and addresses of all witnesses of any accident involving injury to persons or property; written statements being obtained whenever possible.

Notifying
other
trains.

85. If a conductor discovers any defect in track, bridges or culverts, which might cause an accident, he must not rely wholly upon the telegraph to notify other trains, but must leave a flagman.

Duty of al
to report
defects or
obstruc-
tions.

86. **It is the duty of every employe, regardless of department, to report defects** in road or bridges, or obstructions of any kind, to the Superintendent, and, if possible, to the nearest section or bridge foreman. When necessary flags and torpedoes must be left to notify approaching trains; and when there is any reason to believe that the safety of the track or of any structure is endangered by flood, fire or other causes, any employé, before attempting its use, must make a personal inspection, using all precautions in the interest of life and property.

Position of
switches.

87. At points where trains meet or pass the employé attending the switch will, after locking it to main track, take position on opposite side of track from the switch-stand, and remain there until the expected train has passed. Except to prevent accident, switches must never be turned when an engine or car is on slide rail.

At stations where yardmasters are employed they will be held responsible for the proper position of switches. All main line switches in yards must invariably be set and locked for main track. Inside switches may be left as used.

At stations where yardmasters are not employed, agents will be held responsible for the

proper security and position of switches, which must be set for the main track and locked; they must know personally, at least ten minutes before regular trains are due, and before leaving the station at night, that switches are secure.

Yard engines.

88. Yard engines working within the limits of any established yard may use the main track day and night, keeping out of the way of all regular trains; but they must not occupy the main track on the time of a due or delayed train except under proper protection.

Engine-man as conductor.

89. In case an engine is run over any portion of the road unaccompanied by a conductor, the engineman must perform the duties and make the reports required of a conductor, in addition to his own.

Flying switches.

90. Running or flying switches must not be made except where it would cause great delay to do the work in any other manner; and whenever they are made, the train must first be stopped, and before the engine is again started the switch and also the brakes on the cars to be set out must be tested, and great care used.

Cutting off the engine, with or without part of the cars in the train, before a train has stopped at a station, and allowing the remainder of train to follow, is forbidden. Every train must be brought to a full stop before the engine is uncoupled.

Filling out trains.

91. Conductors and enginemen are required to fill out their trains to the full capacity of their engines. Enginemen must not refuse to take the assigned number of cars in their trains, but must use their best efforts to haul them. Should en-

ginemen think that the capacity of their engines is overestimated, their proper course is to report the matter to the Superintendent.

92. When trains are equipped with air-brakes, enginemen will be held responsible for the rate of speed; but when trains are not so equipped, or when the air-brake fails to work, conductors must see that speed is controlled by brakemen using hand-brakes. When hand-brakes are used they should not be applied so as to cause the wheels of cars to slide, nor kept on so long as to heat the wheels; to avoid this the applied brakes should be frequently changed from one car to another.

Use of brakes.

93. When starting from stations, brakemen must watch closely to see that brakes are fully released, and will immediately signal enginemen to stop if wheels are found sliding.

Flat wheels.

Each brakeman will be held responsible for any wheels slid flat under the part of the train in his charge.

Conductors in reporting flat wheels will give name of brakeman in charge.

94. On all grades, when stopping on the main line or on a siding, when cutting an engine off a train at stations to do work, or at any stops of unusual length, the air must be released and a sufficient number of hand-brakes set to hold the train. Both conductors and enginemen will be held responsible for failure to comply with this rule.

Hand-brakes must be set.

95. In placing cars on sidings, care must be taken to leave the streets and highways, in daily use by the public, unobstructed their entire width. When trains obstruct road cross-

Crossings must not be obstructed.

ings they must be cut to open a passage or roadway, if there be any persons who desire to cross. Agents must see that this is done and report any failure to the Superintendent. In no case must a train be backed over a public crossing or highway, unless there is a man on rear car to see that the way is clear; nor must a car be cut loose and allowed to run over a public crossing or highway, unless there is a man on the car. At night the man referred to must display a light.

Going to meals.

96. Conductors and enginemen are forbidden to delay their trains for the purpose of going to meals, or for any similar reason, without permission from the Superintendent.

If permission be received, the conductor must report for orders when ready to go.

Freight trains carrying passengers.

97. Freight trains will not carry passengers, except as designated in the time-tables. When a freight train is composed of two or more sections, the rear section must do the local work, and if designated to take passengers, is the only one on which they will be carried. Employés with passes, traveling on business of the Company, may, however, be carried on all freight trains between stations at which such trains stop. Persons accompanying live stock, or other freight requiring man in charge, may be carried on same train with it, when provided with proper transportation. Freight conductors will allow none but the freight crew to ride on freight cars, and when persons in charge of stock are attending to their duties, notice must be given in time to enable them to reach the caboose before the train starts.

Conductors responsible for work of brakemen.

98. Conductors will be held responsible for the faithful performance of duty by their brakemen. They must require the doors of all **box**

cars in their trains to be closed, whether cars be loaded or empty, and must in all cases when ascending or descending grades, station themselves where they can see that brakemen are at their proper places on top of train.

99. When leaving cars on side tracks conductors must see that the hand-brakes are set, and that cars are properly secured against running or being blown out on main track; also, that they are far enough from the main track to clear all passing trains. If a car without a brake be set out, conductors must block the wheels securely and notify the agent.

Securing cars on sidings.

100. Conductors must enter the initials and numbers of all cars in their train-book in the order in which they stand in the train. They will receive from the yardmaster or agent all way-bills, and must check them with the cars, to see that they have a way-bill for each car. No car must be taken without a way-bill except by special order in each case. At the end of their run, or at stations where they leave cars or freight, they must give the way-bills to the yardmaster or agent.

Entering cars in train-book.

101. In making up trains, except when otherwise ordered by the Superintendent, cars for the same destination must be kept together; those for the most distant station at the rear of the train (except as per rules governing placing of live stock and inflammable freight), and so on, working ahead in station order, with the way cars ahead of all. Conductors picking up cars must place them with others for the same destination.

Making up trains.

When passenger trains handling mail cars are run in two or more sections, the mail cars must

always be placed in the first section, in order to comply with the regulations of the U. S. Post Office Department.

Reporting
delays.

102. Conductors, and enginemen acting as conductors, must report promptly by wire to the Superintendent all delays and irregularities of any kind, giving full particulars, including engine and car numbers and initials. Enginemen must make a similar written report of delays to their Master Mechanic.

Registering.

103. Freight conductors must fill out registering tickets in the prescribed form, leaving one at every telegraph station not provided with train register, stating whether carrying signals or not. Operators must report such tickets to the Superintendent promptly. Passenger conductors will fill out a registering ticket, giving the number and kinds of cars in their trains before leaving terminals.

Economy
in use of
cars.

104. Care must be taken to use cars judiciously, never forwarding one with less than 5000 pounds, and loading small lots on passing trains. Exceptions may be made in case of perishable freight, when passing trains have no room. At junction points, if cars contain less than 10,000 pounds, the freight should be consolidated with other lots, and forwarded without unreasonable delay. Conductors must not take cars containing less than 5000 pounds from way stations, if room can be found for the freight in cars already in their train.

Loading
foreign
cars.

105. Foreign cars must not be loaded with local freight without permission from the Superintendent, except in routing the car homeward, and then only when it is impracticable to secure

a through load to or beyond the terminal where the car was received from connecting line, without unreasonable delay.

106. Agents must see that cars are properly loaded, and in case they find them overloaded, or improperly loaded, will at once notify the shipper and have the excess weight taken off or the load properly secured. In case of delay on the part of the shipper, the fact should be reported at once to the Superintendent.

Proper
loading of
cars.

In case of long material, requiring two cars, the brake-wheel and staff may be removed if necessary, but must be carefully secured to and forwarded with the car. Whenever it is possible to do so, flat cars to be loaded double must be switched so that brake-wheels will be on the outer ends.

107. Kerosene, coal oil, naphtha, benzine or any other substance of an inflammable nature, must not be loaded or unloaded through freight houses, except in the daytime. **Lights must not, under any circumstances, be allowed near such packages;** and consignees should be requested to remove such freight promptly.

Oils.

108. Whenever Company material in carloads is received at any station, for which there is no disposition, agent will report to the Superintendent at once by wire, giving contents and any other information he may have, so that it may be arranged to have the cars unloaded promptly.

Company
freight.

109. Agents will give particular attention to the loading and unloading of live stock, render all necessary assistance, see that cars are

Handling
live stock.

in proper condition, and doors securely fastened before leaving the station. Such cars must be placed in the rear of trains.

Live stock law.

110. The attention of agents and conductors is called to the **laws regulating transportation of live stock**, which imposes a heavy penalty in case of confinement of stock on interstate trips for a longer period than **twenty-eight** consecutive hours without unloading for rest, water and feeding for a period of at least **five** consecutive hours; and on trips wholly within any state or territory for a period of not longer than **thirty-six** consecutive hours without being unloaded as above for a period of at least **ten** consecutive hours. Agents must see that way-bills for live stock **show date and hour** at which it was loaded.

Inflam-
mable freight.

111. In loading hay, straw or other inflammable freight, good cars must be selected, and all openings must be closed and securely fastened. Cars loaded with such freight must be placed in the rear of trains, as near the caboose as possible (in preference to stock), and never ahead, near the engine.

Dead
Engines.

112. Dead engines, or disabled engines with one or both side-rods taken down, should not be hauled in fast freight trains when it is possible to avoid it. Under no circumstances must such engines be hauled at a speed exceeding one mile in three and a half minutes.

"Bad
order"
cars.

113. Conductors must see that the words "bad order" and the date are written with chalk on both sides of disabled cars, that defective parts are marked with a cross, and report to the Superintendent by wire, giving initials and numbers, and if loaded, contents and destination, and where set out.

114. Agents, where car repairers are not employed, must report all disabled cars at their station, giving initials and numbers, and if loaded, contents and destination, stating what is needed to make repairs, and by what train set out. Way-bills for disabled cars must be kept separate from others to prevent cars being taken away by mistake before repairs are made.

Reporting
disabled
cars.

115. When cars are derailed, they must not be turned over, thrown down embankments, broken up or otherwise damaged unnecessarily, merely to get them out of the way. Every effort must be made by trainmen or wrecking crew to put them on the track with as little damage as possible.

Unneces-
sary dam-
age to cars.

116. Station agents are required to see that doors of all loaded cars on side tracks are closed and securely fastened, that brakes are set and cars far enough from the main tracks not to endanger passing trains, and when necessary to secure perfect safety that wheels of all cars are properly blocked.

Cars on
sidings.

117. In weighing cars they must in all cases be uncoupled at both ends. When the weight of an empty car varies 200 pounds from the weight marked on the car, agents will report same at once to the Freight Auditor on blank form provided for that purpose.

Weighing
cars.

118. Enginemen must allow no one to handle their engines except their firemen, in their presence, and then only by consent of the Master Mechanic, the responsibility, however, remaining with the engineman.

Handling
engines.

119. Great care must be taken to prevent killing live stock, bringing the train to a full

Killing
stock.

stop if necessary. If any stock be killed, or struck, the engineman must report it in writing, on the prescribed form.

Setting
fires.

120. Enginemen must use every precaution to prevent setting fires along the line. They must carefully and frequently inspect netting or other apparatus provided for arresting sparks, and see that it is in good order. They must not throw out any burning waste, clinkers, or other material along the line. Dampers of ash-pans must in all cases be closed while engines are crossing bridges and passing wood-yards.

Throwing
fuel from
tender.

121. Enginemen and firemen must not throw any fuel from the tender while in motion. If any be found unfit for use, it should be thrown off at engine-house yard at end of run. Wood must not be piled on tenders so as to be likely to fall off.

Attention
of engine-
men to sig-
nals when
starting.

122. Before starting from a station, the engine and fire must receive the necessary attention, so that both the engineman and fireman, after starting, may be at liberty to attend to any signals which may be given.

Duty of
yard-
masters.

123. Yardmasters will have charge of and direct the movements of all trains and engines at their stations. They will receive instructions from the Superintendent, and must obey proper orders of station agents.

Train bag-
gagemen.

124. Train baggagemen are under the immediate charge of the conductors of their respective trains, and must obey them accordingly.

They are required to be at their cars at initial stations in ample time to finish work required of them before leaving time.

125. Unless ordered by conductor to perform other duties, baggagemen must remain in their cars while on duty, and must not leave cars on the road, or at the end of their run, until all baggage has been received from or delivered to the station agent or station baggageman.

126. Baggagemen must not receive for transportation any articles not checked, except Company's supplies with proper way-bills, unless specially instructed by the General Baggage Agent or the Superintendent.

127. Employés are forbidden to forward letters or packages containing money, whether registered or not, in baggage cars; and train baggagemen must refuse to receive such letters or packages for transportation as "railway business." Any train baggageman who discovers after he has left a station that a money-letter or package has been given him with other mail for transportation, must forward it to the Superintendent of the Division with explanation.

128. It is permitted to carry by train mail, between all points on lines operated by this Company:

Train mail.

1. All letters and packages of letters to and from its officers, agents, and employés, when relating to the business of the Company.

2. All letters and packages of letters to its officers, agents, and employés from connecting railroad lines, when relating to the joint business of the companies, or to the business of this Company.

3. All letters and packages of letters from its officers, agents, and employés to connecting railroad lines, when relating to the joint business of the companies, to the business of this Company, or to the business of such connecting company.

4. Letters and packets of letters between the local representatives of Railroad Associations, of which this Company is a member, and employes, regarding the business of this Company, when the same may be received from or delivered to such parties by this Company, its agents or employes.

5. Printed railway advertising matter, folders, circulars, tariffs, printed blanks, way-bills, and kindred matter when relating to business in which this Company is interested.

6. All other matter relating or pertaining to Company business may be carried by train mail if accompanied by no communication or other matter giving it the character of personal correspondence, without reference to its origin or destination.

129. It is prohibited to carry by train mail:

1. Letters that do not pertain strictly to the business of this Company, to joint business with a connecting railroad line, or to the business of such connecting line.

2. Letters relating to the personal affairs of employes.

3. Letters (except when contained in Government stamped envelopes) addressed to and relating to the business of other companies, corporations or individuals operating car lines (either passenger or freight), hotels, restaurants, or any other class of business connected or not connected with this Company.

All such prohibited matter must be promptly stamped and forwarded by United States mail.

Correspondence for General, Commercial, and Traveling Agents of this Company, when located at points on foreign lines, must be sent through the United States mail.

The foregoing prohibitions have no application to any except **first-class mail matter**, that is, letters in sealed envelopes or packages.

For every violation of the law, the Company is liable to a fine of one hundred dollars; in addition to which the employe committing the offense is liable to a personal penalty of fifty dollars.

130. Whenever the duties of employes require them to handle United States mail care must be used to see that it is safely and promptly handled and correctly delivered as per marks on sacks or pouches. When the latter are without marks, or improperly marked, to show destination, they must not be received. If, however, they are in this Company's charge before the error is discovered, they must be turned over to the nearest postmaster, and the facts reported to the Superintendent by wire.

U. S. Mail.

131. Freight, baggage or other articles must not be allowed to remain on depot platforms where they may cause accident or inconvenience to passengers or employes, receive damage from the weather or be stolen. U. S. mail-pouches must not be left unprotected upon the platforms, nor in the waiting-rooms or other exposed places at stations.

Protecting freight, baggage, mail, etc.

132. Agents and operators report to, and receive their instructions from, the Superintendent, in all Operating Department matters.

Agents and operators.

133. Agents and operators **must** keep the public out of their offices, transacting their business over the counter. They **must** prevent lounging or disorderly conduct about their premises. They must make themselves familiar with the business interests of the people amongst whom they are stationed, and keep the Superintendent informed of the probable effect on business, of changes actual or proposed in train service. They must acquaint him with the views and requests of patrons of the Company, and with such local news as may seem important.

Selling tickets

134. Agents must familiarize themselves with the current time-tables, and must not sell tickets to stations at which trains do not stop, or for trains that do not carry passengers.

Ticket offices must be opened at least thirty minutes before trains are due.

Telegraph Co. rules.

135. Operators must familiarize themselves with and obey the Telegraph Company's rules.

Preference to railroad business.

Station agents who act as agents of an express or other company must give precedence to the business of the Railroad Company.

Injury or damage.

136. Agents will be held responsible for accidents to persons, freight or other property, occurring through defective appliances that they have failed to report.

Inspection and care of station premises.

137. Agents are required to make daily inspection of yards, platforms, offices and buildings, and to co-operate with Roadmasters in maintaining the station premises in a neat and tidy condition.

Office hours.

138. Office hours at stations will be fixed by the Superintendent, and must be strictly observed. Day operators must keep the location of their residences posted up inside bill-boxes at stations where there are no night operators, so that trainmen may know where they can be found.

Sema-phores.

139. Agents and operators must keep trains the proper time limit apart with their fixed signals. See Rules 81, 387, 388, 389 and 474.

Station force.

140. All who have authority to employ men are required to **keep their force down to con-**

form to the amount of business done. This they are expected to do without waiting for a special order.

141. All property found on the road must be promptly forwarded to the Superintendent, or notice be given him at once of its having been found. Lost property.

142. The use of the telegraph must be restricted to urgent business or where an immediate answer is necessary. Telegrams should be brief. Use of telegraph.

143. All employés will be regarded in line of promotion, advancement depending upon the faithful discharge of duty and capacity for increased responsibility. Promotion.

144. When a person is discharged from any department or division of the Company's service, he must not be re-employed without the written approval of the Manager. Re-employment.

145. Employés are forbidden to offer testimonials to their superiors, either directly or indirectly; and those in authority must not accept presents or testimonials. The acceptance of gratuities or rewards from passengers or patrons of the Company is also forbidden. Testimonials and gratuities.

146. Employés, on leaving the Company's service (or at any time when required to do so by proper authority), must deliver up in good order any property entrusted to their care. Surrendering property.

SPECIAL RULES FOR TRACKMEN, BRIDGEMEN AND WATCHMEN.

147. All employés in the Maintenance of Way Department must do all in their power to prevent accidents, even though in so doing they may occasionally have to perform some one else's duty.

148. Trackmen and bridgemen must make themselves familiar with the meaning of signals of all kinds, and regulations relating thereto. They must report to the Roadmaster or Bridge Superintendent any and all violations of the rules that come to their notice, giving full particulars in order that the responsibility may be ascertained and a repetition prevented.

Failure of trainmen to respect signals must be promptly and invariably reported, giving train number and signals disregarded.

149. The signals to be used by section and bridge men are **red** and **green** flags by day, **red** and **green** lights by night, and **torpedoes**.

When necessary to stop a train, a **red** flag by day, or a **red** light by night, together with a **torpedo** fixed to the rail on the engineman's side, must be placed ninety (90) rails, or fifteen (15) telegraph poles from the place where the train must stop. These signals must always be used when rails are taken up, or any work is being done on track, or bridges, which makes it unsafe for trains to pass.

A **green** flag by day, or a **green** light by night, is a signal to run slowly and look out for defective track.

Particular attention is called to Rules 323 to 332 inclusive, and to all other rules governing signals.

Red clothing may be mistaken for danger signals, and must not be worn.

150. Each foreman must provide himself with a reliable watch, must compare it with the clock in the telegraph office at his station, daily, if possible, and must know that he has correct time.

Watches.

151. All foremen will be held responsible for the proper condition of the track and structures under their charge.

Responsible for track and structures.

152. All men at work on the track or bridges must bear in mind that, in operating the road under telegraphic orders, a train may pass at any moment. They must keep a sharp lookout for trains from either direction, and **must not assume that a train may not come for any certain time, nor act on the assurance of any person to that effect, but will at all times protect themselves with proper signals, as per Rules Nos. 149, 154 and 155.** Roadmasters and bridge foreman will be held responsible for the proper understanding and strict observance of these rules by themselves and those under them. Foremen must know that their gangs are always supplied with the proper signal flags, lanterns, torpedoes, etc., and are thoroughly instructed as to their use.

Looking out for trains.

153. Every employé whose duties require him to use or obstruct the track must keep a copy of these rules and the proper time-table on his person or hand car while on duty, and must

Rules and time-table.

produce them when required to do so by the Roadmaster, Bridge Superintendent or other person in authority.

Track to be inspected.

154. Track foremen must pass over their sections at least once every week, inspecting closely. Each foreman must pass over in person or send one of his men over the section or sections, under his charge during storms, when the road is liable to be damaged, at least once every day during the continuance of such storms; and he must pass, or send one of his men, over the track under his charge, when no damage thereto is threatened by storms or unusual circumstances, at such intervals of time as may be specified by the Roadmaster or other proper authority. Each track foreman or trackman going over the track as above must take with him a track-wrench, four **torpedoes**, two **red** flags, and (when likely to be needed) two **red** lamps, and must carefully examine the track to see if it is safe for the passage of trains. If any place is found unsafe, he must at once fix red signals on both sides at a distance of ninety (90) rails (or fifteen telegraph poles). The flag-stick must be firmly driven into the ground in such position that the flag or lamps may be plainly seen from an approaching engine, and a torpedo fixed on the rail on the engineman's side. If a train is expected before he can get help to repair the track, he must place himself on the side of the expected train and give signals to stop. If the train is not expected before he can get help, he may, after he is satisfied that the flags or lamps and torpedoes are properly fixed, go for assistance.

Special watchmen must be provided with proper signal lamps, flags and torpedoes, and must be instructed how to use them.

155. At all times when work is going on which renders it necessary for trains to reduce speed, a **green** flag must be set at side of track at least ninety rails or fifteen telegraph poles from the work, on engineman's side, in each direction, as a caution to approaching trains to run slowly. After severe rains or a thaw, a hand car or velocipede car must be sent over the road before the passage of regular trains, for the purpose of ascertaining if track is safe.

Position of danger signals.

156. Foremen must so regulate their work as not to interfere with the passage of trains on their schedules, but they will have the right to work whenever trains of classes inferior to the first-class are thirty (30) minutes late, protecting themselves in both directions with prescribed signals.

Times to make repairs.

On approach of such delayed trains they must be allowed to pass with the least possible delay.

157. When track at or on bridges, trestles or cattle guards is out of line or surface, bridge superintendents or bridge foremen must be notified, and if the defect renders the track unsafe, track foremen must make such temporary repairs as they can, protecting the point with slow or danger signals as may be necessary.

Track on bridges.

158. Except in emergencies, trackmen, bridgemen, or other repairers, must not work between another gang of men and the flagmen, or signals set by such other men in accordance with Rules 149, 154 and 155. When, however, it is necessary for any gang to work, or to occupy the track in such position, they shall at once place a flagman, or set signals per Rules 154 and 155, between themselves and the other gang, and as far

Signals for two gangs.

as possible from such other gang. When one gang of trackmen, bridgemen, or other repairers passes another gang at work, it shall be the duty of the foreman of such passing gang to ascertain what signals are out, and govern himself accordingly.

Work during fog or snow-storm.

159. In no case, except when the track is unsafe, is any work which will obstruct the passage of trains to be done during a fog or snow-storm.

If, during a fog or snow-storm, the track is found unsafe, a torpedo must be fixed on the rails, on the engineman's side, and a man stationed on each side of the unsafe place with a red light at a distance not less than provided for in Rules 149, 154 and 155.

If short-handed, red lights must be hung in plain sight and torpedoes used, as provided for in Rule 149.

Observing signals.

160. All foremen must observe closely all trains that pass, to see if any signals are carried by them to show that another train is following, as a section of the passing train, or if any notices are thrown off. (See Rules 336 and 337.)

On duty during storms.

161. During heavy storms, whether by day or night, whereby the track, or any portion of the Company's property, becomes liable to sudden damage, foremen and trackmen must be on duty; and at such times they are required to go over their sections to make sure that the track is safe, taking danger signals with them. The points most liable to damage must be first visited.

162. Hand cars and push cars not in actual use must be lifted off the track and placed well clear of trains. They should not be placed in roads so as to obstruct them. If out of sight they must be locked. Hand and push cars.

163. Loaded push cars must be protected in both directions by danger signals. They must never be used in fogs or at night unless absolutely necessary.

164. Hand cars must be run with great caution at all times, and particularly at night and in fogs. Frequent stops to listen for approaching trains must be made, and on grades flagmen must be sent ahead around all curves as an additional precaution. If in foggy weather the destination of the men is within a mile either way of the section house, they should walk to work; the car must not be used.

165. Hand cars must be examined at least once a week for loose bolts and defects. They must be kept in good order, bearings and machinery well greased, and must never be used when to do so involves risk of accident.

Hand cars and other Company property must not be used except on Company's business.

166. Foremen must work with their men personally, unless, on account of their having a large number of men under them, they are excused from this duty by the Roadmaster or Bridge Superintendent. Foremen to work with their men.

167. The track must be kept clear; and it is the duty of foremen to turn out promptly with all their men and remove any obstruction, when- Removing obstructions.

ever notified by trainmen or others, even though the obstruction may not be on their sections. If notified of broken rails on an adjoining section they must at once make track safe for trains.

Anything that interferes with the safe passage of trains at full speed is an obstruction.

Train accidents.

168. When assisting a train delayed by accident, foremen will act under orders of conductor or other person in charge of train, until the arrival of the Roadmaster or foreman of wrecking car. After his arrival the foreman of the wrecking car will have full charge of the removal of the wreck.

Foremen must appoint the necessary watchmen at wrecks who must remain on duty until the goods are removed or until they are relieved from this duty by order of the Superintendent. In carrying out this rule trackmen are authorized to leave their sections, and bridgemen the limits of their jurisdiction, without special orders.

169. Such material as broken rails, axles, or other debris, which may be of use in determining the cause of accidents, must be preserved.

Cuts, tunnels, and trestles.

170. Track foremen must examine cuts and tunnels as they pass along, to see whether there is anything likely to fall on the track.

They must report to the Roadmaster if any of the water-ways or ditches are too small, and such points must be watched during severe rain or snow storms.

Culverts must be examined frequently, and kept clear.

They must keep the earth cleared away from the sills of trestle bents and piers or abutments, of wooden bridges, and must also see that all grass, weeds, and other combustible material is cleared away from all wooden structures.

Protection against fire.

During dry weather no fires must be started unless they can be kept under control.

171. Grass, weeds, old ties and rubbish on right of way must be burned at such times as the Roadmaster may direct, always using the greatest care to prevent the fire from spreading to adjoining fields, farm fences, or bridges, and **under no circumstances must any fire be left burning after working hours.**

Sectionmen must use every effort to extinguish fires off the right of way, even though no responsibility attaches to the Company.

172. Foremen must look after water stations, and see that the supply is kept up, and promptly report any failure or defect by telegraph to the Superintendent and Roadmaster.

Water supply.

173. Track foremen will be governed by State and Territorial laws, as printed in appendix to Rules of Maintenance of Way Department, in disposing of animals killed or injured by trains or otherwise on the Company's right-of-way or other grounds. They must promptly slaughter all animals fatally injured. When not inconsistent with the laws, they must notify the owner of the stock, and if he does not take charge of the animals within reasonable time they will bury the carcasses, or sell the meat and hides to the best advantage, send the

Stock killed or injured.

money received therefor to the Treasurer, and inform the owner of the stock accordingly.

Foremen must investigate every case of injury to stock and make a full report to the Superintendent and Roadmaster on the blank forms provided for that purpose. They will be held responsible for any damage that may be caused by their neglect to keep fences and cattle-guards in proper repair.

174. All articles of clothing, or anything that may belong to passengers or trainmen, found on the track must be sent to the Superintendent, with a report stating when and where found and the day each article was sent to him.

Any freight that has fallen from cars must be sent to the nearest station at which there is an agent or telegraph operator, and a receipt taken therefor.

If it is too heavy for hand-car the Superintendent must be notified by wire.

175. Trackmen must pay particular attention to the telegraph lines. In case the wires are found broken or on the ground, crossed, or in any way obstructed, they must be **repaired** in a temporary manner **immediately**; the nearest telegraph station must be informed of damage and nature of repairs made, and, where repairs cannot be made by them, notice must at once be given to the nearest telegraph office. They must inform themselves of location of the **division wire** on poles or cross-arms; and, when all the wires are down or broken, the **division wire** must be repaired first.

Articles
found.

Telegraph
lines.

176. All cars loaded with track material of any kind must be unloaded without delay, as soon as it is known to be on any siding and intended for that station, unless distinctly ordered otherwise.

Unloading
track ma-
terial.

177. All accidents, no matter how trivial, must be reported on proper form. Those of a serious nature must be reported immediately to Superintendent by wire, and afterward reported on the proper form.

Reporting
accidents
and in-
juries.

TRAIN RULES.

STANDARD TIME.

Time.

312. Pacific, or 120th Meridian, is the only recognized Standard Time.

313. The Standard Time will be telegraphed to all points from the Lick Observatory at 12 o'clock, noon, each day except Sunday.

Standard
clocks.

314. Certain clocks will be designated as Standard Clocks.

315. Conductors and enginemen must not take time from any clock unless it is designated as a Standard Clock.

Watches.

316. Each conductor and engineman must have a reliable watch which has been examined and certified to on a prescribed form, by a designated inspector, and must file such certificate with the Superintendent before he is allowed to go on duty. Watches must be examined and certificates renewed every six months.

(Form of Certificate.)

CERTIFICATE OF WATCH INSPECTOR.

This to certify that on18....
the watch of.....
employed as.....
on the..... R.....
has been examined and found to be a reliable and accurate time-piece, and in such repair as will, in my judgment, with proper usage, enable it to run within a variation not to exceed thirty seconds per week.

Name of Maker.....

Brand.....

Number of Movement.....

Gold or Silver.....

Open or hunting case.....

Stem or key winding.....

Signed,.....

Inspector.

Address.....

317. Each conductor and engineman must compare his watch with the designated Standard Clock before starting on each trip, and register his name and the time he compared his watch, on a prescribed form.

Comparing
watches.

318. Conductors and enginemen whose duties prevent them from having access to a Standard Clock must compare their watches daily with those of conductors and enginemen who have Standard Time, and have registered as provided in Rule 317.

TIME-TABLES.

319. A Time-table is the general law governing the time of all regular trains at all stations. The times given for each train on the Time-table is the Schedule of such train.

Time-table
defined.

320. Each Time-table, from the moment it takes effect, supersedes the preceding Time-table and all special instructions relating thereto. A train of the preceding Time-table shall, unless otherwise directed, take the time and rights of the train of the same number on the new Time-table.

Taking
effect.

A train of the new Time-table which has no corresponding number on the preceding Time-table shall not run until it is due to start from its initial point on any division after the Time-table takes effect.

321. Upon the Time-table not more than two sets of figures are shown for a train at any point. When two times are shown, the earlier is the arriving time and the later the leaving time. When one time is shown it is the leaving time unless otherwise indicated.

Time-table
figures.

Regular meeting or passing points are indicated on the time-table by figures in **full-faced type**.

Both the arriving and leaving time of a train are in **full-faced type** when both are meeting or passing times, or when one or more trains are to meet or pass it between those times.

Where there are more trains than one to meet or pass a train at any point, attention is called to it by ———.

In all cases trains are required to clear and follow as per Rules 385 to 390 inclusive.

322. On the Time-table the words "daily," "daily, except Sunday," etc., printed at the head and foot of the schedule of a train, indicate when it shall run. The following signs placed before the figures indicate:

"s" —regular stop:

"f" —stop on signal to receive or discharge passengers or freight:

"||" stop for meals.

Trains are designated by numbers and their class indicated on the Time-tables.

NOTE.—All trains running from San Francisco will be designated by odd numbers and called East-bound; all trains running toward San Francisco will be designated by even numbers and called West-bound.

SIGNAL RULES.

SIGNALS.

323. All employes whose duties may require them to give signals, must provide themselves with the proper appliances, and keep them in good order and always ready for immediate use.

Signs and characters.

Signal appliances.

(Insert at top of page 41.)

GREEN signals have been substituted for white to indicate safety, and YELLOW for GREEN to indicate caution.

Therefore, wherever the word "WHITE" appears in Rules 76, 77, 149, Note to 149, Rules 155, 326, 327, 474, 710 and in first line on page 84 of the Rules and Regulations, GREEN should be understood, and wherever "GREEN" appears YELLOW should be understood.

327. White signifies safety, and is a signal to go on.

328. Green and white is a signal to be used to stop trains at flag stations for passengers or freight.

329. Blue is a signal to be placed on a car or an engine to forbid its being moved.

330. A torpedo, placed on the top of the rail, is a signal to be used in addition to the regular signals. Torpedoes.

The explosion of one torpedo is a signal to stop immediately; the explosion of two torpedoes not more than 200 feet apart is a signal to reduce speed immediately, and look out for a danger signal.

331. A fusee is a signal which may be used in addition to the torpedoes or other signals. Fusees.

332. A flag or lamp swung across the track, a hat or any object waved violently by any person on the track, signifies danger, and is a signal to stop. Danger signal.

TRAIN SIGNALS.

333. A train while running, must display two green flags by day and two green lights Markers.

by night, one on each side of the rear of the train, as Markers, to indicate the rear of the train. Yard engines will not display Markers.

Head and tail lights.

334. A train running after sunset, or when obscured by fog or other cause, must display the head-light in front, and two or more red lights in the rear. Yard engines must display two green lights instead of red, except when provided with a head-light on both front and rear.

Bell-cord.

335. Each car on a passenger train while running must be in communication with the engine by a bell-cord or an equivalent appliance.

Green signal.

336. Two green flags by day and night, and, in addition, two green lights by night, displayed in the places provided for that purpose on the front of an engine, denote that the train is followed by another train, running on the same schedule and entitled to the same timetable rights as the train carrying the signals.

White signal.

337. Two white flags by day and night, and, in addition, two white lights by night, displayed in the places provided for that purpose on the front of an engine, denote that the train is an extra. These signals must be displayed by all extra trains, but not by yard engines.

NOTE.—When an engine is running backward, the signals provided for in Rules Nos. 336 and 337 must be displayed in the same position on the engine as when it is running forward, and, in addition, the engine must carry a white light on rear of tender over center of track.

Blue signal.

338. A blue flag by day and a blue light by night, placed on or at the end of a car, engine, or train, denote that workmen are at work under or about the car, engine, or train. The car, engine, or train thus protected must not be coupled

to or moved until the blue signal is removed by the person who placed it.

When a car, engine, or train is protected by a blue signal, other cars must not be placed in front of it, so the blue signal will be obscured, without first notifying the workman, that he may protect himself.

WHISTLE SIGNALS.

Whistle.

339. One long blast of the whistle (thus, —) is the signal for approaching stations, railroad crossings, and junctions.

340. One short blast of the whistle (thus, —) is the signal to apply the brakes—stop.

341. Two long blasts of the whistle (thus, — —) is the signal to throw off the brakes.

342. Two short blasts of the whistle (thus, --) is an answer to any signal, except "train parted."

343. Three long blasts of the whistle (thus, — — —), to be repeated until answered as provided in Rule No. 362, is a signal that the train has parted.

344. Three short blasts of the whistle (thus, ---), when the train is standing (to be repeated until answered, as provided in Rule No. 361) is a signal that the train will back.

345. Four long blasts of the whistle (thus, — — — —) is the signal to call in a flagman from the west or south.

Four long followed by one short blast of the whistle (thus, — — — — —) is the signal to call in a flagman from the east or north.

346. Four short blasts of the whistle (thus, ---) is the engineman's call for signals, from switch tenders, watchmen, trainmen, and others.

347. Five short blasts of the whistle (thus, -----) is a signal to the flagman to go back and protect the rear of the train.

NOTE.—Enginemen on freight trains will give three short blasts of the whistle and repeat (thus, --- ---) before entering tunnels, covered bridges, snowsheds, or passing under low bridges, to warn trainmen to keep clear of danger.

348. One long followed by two short blasts of the whistle (thus, — —) is a signal to be given by trains on single track, when displaying signals for a following train, to call the attention of trains of the same or inferior class to the signals displayed.

349. Two long followed by two short blasts of the whistle (thus, — — —) is the signal for approaching road crossings at grade.

NOTE.—Extra trains, and regular trains behind time, must sound this signal repeatedly in obscure places to warn section men and bridge men. The same precaution must be used in fogs and snowstorms.

350. A succession of short blasts of the whistle is an alarm for persons or cattle on the track, and calls the attention of trainmen to danger ahead.

BELL-CORD SIGNALS.

351. One tap of the signal-bell, when the train is standing, is the signal to start.

352. Two taps of the signal-bell, when the train is running, is the signal to stop at once.

Bell-cord
signals.

353. Two taps of the signal-bell, when the train is standing is the signal to call in the flagman.

354. Three taps of the signal-bell, when the train is running, is the signal to stop at the next station.

355. Three taps of the signal-bell, when the train is standing, is the signal to back the train.

356. Four taps of the signal-bell, when the train is running, is the signal to reduce speed.

357. When one tap of the signal-bell is heard while a train is running, the engineman must immediately ascertain if the train is parted, and, if so, be governed by Rule No. 403.

358. Signals of the same number of sounds shall have the same significance when given by other appliances than bell-cords and signal-bells.

LAMP SIGNALS.

359. A lamp swung across the track is the signal to stop. Lamp sig-
nals.

360. A lamp raised and lowered vertically is the signal to move ahead.

361. A lamp swung vertically in a circle across the track, when the train is standing, is the signal to move back.

362. A lamp swung vertically in a circle at arm's length across the track when the train is running, is the signal that the train has parted.

363. A flag, or the hand, moved in any of the directions given above, will indicate the same signal as given by a lamp.

FIXED SIGNALS.

Fixed signals.

364. Fixed signals are placed at junctions, railroad crossings, stations, and other points as required. Special instructions will be issued indicating their position and use.

RULES GOVERNING THE USE OF SIGNALS.

Imperfect signals.

365. A signal imperfectly displayed, or the absence of a signal at a place where a signal is usually shown, must be regarded as a danger signal, and the fact reported to the Superintendent.

Unnecessary use of whistle or bell.

366. The unnecessary use of either the whistle or the bell is prohibited. They will be used only when required by rule or law, or when necessary to prevent accident.

367. (Omitted.)

Acknowledging signals.

368. When a danger signal (except a fixed signal) is displayed to stop a train, it must be acknowledged as provided in Rule No. 342.

Engine bell.

369. The engine-bell must be rung before an engine is moved.

370. The engine-bell must be rung for a quarter of a mile before reaching every public road crossing at grade, and until it is passed; and the whistle must be sounded at all whistling-posts.

Displaying and calling attention to signals.

371. When two or more engines are coupled to the head of a train, the leading engine only shall display the signals as provided in Rules Nos. 336 and 337.

Classification signal.

372. One flag or light displayed as provided in Rules Nos. 336 and 337 will be regarded the same as if two were displayed; but conductors

and enginemen will be held responsible for the proper display of all train signals.

373. When a train is being pushed by an engine (except when shifting and making up trains in yards) a white light must be displayed on the front of the leading car at night, or when the train is obscured by fog or other cause.

White light in pushing trains.

374. When a train turns out to meet or be passed by another train the red lights must be removed and green displayed as soon as the track is clear, but the red must again be displayed before returning to its own track.

Turning markers.

Head-lights on engines, when on side tracks must be covered as soon as the track is clear and train has stopped, and also when standing at the end of double track.

Covering head lights.

NOTE.—In case there is more than one train to take the siding, the engineman of the first train must not cover his headlight until all trains are on the siding and the switches set for the main track.

When an engine heads in on cars on a siding to clear the main track for an opposing train, thereby obscuring the head-light, or if buildings or other obstructions intervene, a flagman must be sent ahead to stop the opposing train until the main track is clear.

375. The combined green and white signal is to be used to stop a train only at the flag stations designated by the schedule of that train. When it is necessary to stop a train at a point that is not a flag station for that train, a red signal must be used.

Signals at flag stations.

376. White signals must be used by watchmen at public road and street crossings to prevent persons and teams from crossing when trains are approaching. Danger signals must be used only when necessary to stop trains.

Watchmen's signals.

377. (Omitted.)

378. (Omitted.)

TRAIN RULES.

CLASSIFICATION OF TRAINS.

Designation of trains.

379. Whenever the word train is used it must be understood to include an engine in service with or without cars, equipped with signals as provided in Rules 333 and 334. Regular trains are those represented on the Time-table, and may consist of one or more sections. All sections of a train, except the last, must display signals as provided in Rule No. 336. Extra trains are those not represented on the Time-table.

Classification.

380. All regular trains are classified on the Time-table with regard to their priority of right to the track; trains of the first class being superior to those of the second and all succeeding classes, and trains of the second class being superior to those of the third and all succeeding classes; and so on indefinitely.

Extra trains.

381. Extra trains may be distinguished as:
 Passenger Extra;
 Freight Extra;
 Work Train Extra.

382. All extra trains are of inferior class to all regular trains of whatever class.

MOVEMENT OF TRAINS.

Classification rights.

383. A train of inferior class must in all cases keep out of the way of a train of superior class.

Right of track.

384. On single track, all trains in one direction, specified in Time-table, have the absolute right of track over trains of the same class running in the opposite direction.

385. When trains of the same class meet on single track, the train not having right of track must take the siding and be clear of the main track before the leaving time of the opposing train; but such train must not pass the switch to back in on a siding until after the arrival of the opposing train, unless otherwise directed by special instructions. When necessary to back in on the siding, before passing the switch a flag-man must be sent out in the direction of the opposing train, as per Rule No. 399.

Taking siding.

386. When a train of inferior class meets a train of superior class on single track, the train of inferior class must take the siding and clear the train of superior class five minutes. A train of inferior class must keep ten minutes off the time of a train of superior class following it.

Clearance.

A first-class train must not arrive at a station where only the leaving time is shown more than one minute in advance of its schedule leaving time.

387. A train must not leave a station to follow a passenger train until ten minutes after the departure of such passenger train, unless some form of block signal is used.

Time between trains.

388. Passenger trains following each other must keep not less than ten minutes apart unless some form of block signal is used.

389. Freight trains following each other must keep not less than ten minutes apart (except in closing up at stations or at meeting and passing points) unless some form of block signal is used.

390. A train must not leave a station expecting to meet or to be passed at the next station by a train having the right of track,

Clearing superior train.

unless it has ample time to reach such station, and clear the track, as per Rules Nos. 385 and 386.

391. A train not having right of track must be entirely clear of the main track by the time it is required by rule to clear an opposing train or a train running in the same direction; failing to do so, it must be immediately protected, as provided in Rule No. 399.

392. Except at meeting or passing points, as provided in Rules Nos. 385 to 391, inclusive, a train must not arrive at a station in advance of its schedule arriving time, when shown.

A train must not leave a station in advance of its schedule leaving time.

393. All trains must stop at schedule meeting or passing points on single track, if the train to be met or passed is of the same class, unless the switches are plainly seen to be right, and the track clear. The point at which a train should stop is the switch used by the train to be met or passed in going on the siding.

When the expected train of the same class is not found at the schedule meeting or passing point, the train having right of track must approach all sidings prepared to stop, until the expected train is met or passed.

394. All trains must approach the end of double track, junctions, railroad crossings at grade, and drawbridges, prepared to stop, and must not proceed until the switches or signals are seen to be right, or the track is plainly seen to be clear. Where required by law, all trains must stop.

Arrival
ahead of
time.

Caution at
meeting
points.

Stops at
crossings
and draw-
bridges.

395. A train must not leave its initial station on any division, or a junction, or pass from double to single track, until it is ascertained that all trains due, which have the right of track over it, have arrived or left.

Leaving
initial sta-
tions and
junctions.

396. (Omitted.)

397. (Omitted.)

398. When it is necessary for the flagman to go back to protect the rear of his train, the next brakeman must immediately take the flagman's position on the train, and remain there until relieved by the flagman; and on passenger trains the baggage master must take the place of the front brakeman whenever necessary.

Flagmen.

399. When a train stops or is delayed, under circumstances in which it may be overtaken by a following train, the flagman must go back immediately with danger signals a sufficient distance to insure full protection. When recalled he may return to his train, first placing two torpedoes on the rail, when the conditions require it.

Protecting
trains by
flags and
torpedoes.

The front of a train must be protected in the same way, when necessary, by the fireman.

NOTE.—When necessary to protect the front end of the train, the front brakeman will be subject to the orders and instructions of the engineman if the conductor be not at hand.

400. (Omitted.)

401. (Omitted.)

402. When it is necessary for a train on double track to cross over to the opposite track, a flagman must be sent out with danger signals, as provided in Rule No. 399.

Crossing
on double
track.

Train parted.

403. If a train should part while in motion, trainmen must use great care to prevent the detached parts from coming into collision. Enginemen must give the signal, as provided in Rule No. 343, and keep the front part of the train in motion until the detached portion is stopped.

The front portion will have the right to go back, regardless of all trains, to recover the detached portion, first sending a flagman with danger signals one half mile in the direction in which the train is to be backed, and running with great caution, at a speed not exceeding four miles per hour. On single track all the precautions required by the Rules must also be taken to protect the train against opposing trains. The detached portion must not be moved or passed around until the front portion comes back. This rule applies to trains of every class.

When it is known that the detached portion has been stopped, and the whole occurrence is in plain view, no curves or other obstructions intervening, so that signals can be seen from both portions of the train, the conductor and engine-man may arrange for the re-coupling, using the greatest caution.

Flagging when pushing train.

404. When a train is being pushed by an engine (except when shifting and making up trains in yards) a flagman must be stationed in a conspicuous position on the front of the leading car, to immediately signal the engineman in case of danger.

Overdue trains.

405. A train starting from its initial station on each division, or leaving a junction, when a train of the same class running in the same direction is overdue, will proceed on its own

time and rights, and the overdue train will run as provided in Rule 388 or 389.

406. A train which is delayed, and falls back on the time of another train of the same class, does not thereby lose its rights.

On other trains' time.

NOTE.—Under this rule a train overtaking a delayed train of the same class cannot pass it without special orders, except as provided for by Rule 408.

407. Regular trains twelve hours or more behind their schedule time lose all their rights.

12-hour Rule.

408. A train overtaking another train of the same or superior class, disabled so that it cannot move, will pass it, and if necessary to enable it to proceed, will take the rights and the orders of the disabled train, and proceed to the first open telegraph office, where it will report to the Superintendent. The disabled train will take the rights and orders of the last train passing it, with which it exchanged rights or orders, and proceed until the first open telegraph office is reached.

Passing disabled train.

NOTE.—A train being disabled, and the Superintendent having been notified that it requires help to be moved, must not be moved if repairs are effected before relief arrives, except under flag, to the next telegraph station.

409. All messages or orders respecting the movement of trains or the condition of track or bridges, must be in writing.

Orders in writing.

410. Trains must not display signals for a following train without orders from the Superintendent or other authority designated by the Superintendent.

Orders for signals.

411. Extra trains must not be run on single track without an order from the Superintendent.

Taking
down sig-
nals.

412. When signals displayed for a following train on single track are taken down at any point before the following train arrives, the conductor must inform the Superintendent promptly by telegraph, and also the operator or switchtender; and the latter, unless there is some other provision for the purpose, must notify all opposing trains of the same or inferior class leaving that point before the train arrives for which signals were displayed.

If signals are taken down at a point where there is no operator, switchtender, or other provision for the purpose, the conductor must notify all opposing trains of the same or inferior class until he reaches the next telegraph office, when he must inform the Superintendent; and the operator, unless there is some other provision for the purpose, must notify all opposing trains of the same or inferior class until directed otherwise by the Superintendent.

If the train for which signals were displayed leaves the main line at a point where there is no operator, switchtender, or other provision for the purpose, a flagman must be left to notify opposing trains that it has arrived.

Work
trains.

413. Work trains will be run as extras under special orders, and will be assigned working limits.

Approach-
ing sta-
tions.

414. Great care must be used by the engine-men and trainmen of a train approaching a station where any train is receiving or discharging passengers.

415. (Omitted.)

416. (Omitted.)

417. Conductors will be held responsible for the proper adjustment of the switches used by them and their trainmen, except where switchtenders are stationed.

Responsi-
bility for
position of
switches.

Whoever opens a switch shall remain at it until it is closed, unless relieved by some other competent employé.

When there is more than one train to use a switch, it must not be left open unless one of the trainmen of the following train is at the switch and takes charge of it.

418. (Omitted.)

419. A train must not start without a signal from its conductor.

Starting
signal.

420. Conductors and enginemen will be held equally responsible for the violation of any of the rules governing the safety of their trains, and they must take every precaution for the protection of their trains, even if not provided for by the rules.

Safety of
train—
responsi-
bility.

421. In all cases of doubt or uncertainty take the safe course and run no risks.

RULES FOR THE MOVEMENT OF TRAINS BY TELEGRAPHIC ORDERS.

Special orders.

450. Special orders, directing movements varying from or additional to the time-table, will be issued by the authority and over the signature of the Superintendent. They are not to be used for movements that can be provided for by rule or time-table. They must not contain information or instructions not essentially a part of them.

They must be brief and clear, and the prescribed forms must be used when applicable; and there must be no erasures, alterations, or interlineations.

Duplicate orders.

451. Each order must be given in the same words to all persons or trains directly affected by it, so that each shall have a duplicate of what is given to the others.

Numbering orders.

452. Orders will be numbered consecutively for each day as issued, beginning with No. 1 at midnight.

To whom addressed.

453. Orders must be addressed to those who are to execute them, naming the place at which each is to receive his copy. Those for a train must be addressed to the conductor and engine-man, and also to a person acting as pilot. A copy for each person addressed must be supplied by the operator.

Dispatcher's record.

454. Each order must be written in full in a book provided for the purpose at the Superintendent's office; and with it must be recorded the names of trainmen and others who have signed for the order; the time and signals, showing when and from what offices the order and responses were transmitted; and the train dispatcher's initials. These records must be made at once on the original copy, and not afterward, from memory or memoranda.

455. The terms "superior right" and "inferior right" in these rules, refer to the rights of trains under the Time-table and Train Rules, and not to rights under Special Orders.

Definition of rights.

456. When an order is to be transmitted, the signal "31" (as provided in Rule 459), meaning "Train Order," will be given to each office addressed, followed by the word "copy," and a figure indicating the number of copies to be made, if more or less than three—thus, "31 copy 5."

Signal "31."

457. An order to be sent to two or more offices must be transmitted simultaneously to as many as practicable. The several addresses must be in the order of superiority of rights of trains, and each office will take only its proper address. When not sent simultaneously to all, the order must be sent first for the train having the superior right of track.

Simultaneous transmission.

458. Operators receiving orders must write them out in manifold during transmission, and make the requisite number of copies at one writing, or trace others from one of the copies first made.

Manifold copies.

459. When an order has been transmitted, preceded by the signal "31," operators receiving it must (unless otherwise directed) repeat it back at once from the manifold copy, and in the succession in which their several offices have been addressed. Each operator repeating must observe whether the others repeat correctly. After the order has been repeated correctly by the operators required at the time to repeat it, the response "O K," authorized by the train dispatcher, will be sent simultaneously to as many as practicable, naming each office. Each operator must write this on the order with the time and then reply "i i O K," with his office signal.

Repeating

Reading
orders
aloud.

Those to whom the order is addressed, except enginemen, must then sign their names to the copy of the order to be retained by the operator, and he will send their signatures to the Superintendent. The response "complete," with the Superintendent's initials, will then be given when authorized by the train dispatcher. Each operator receiving this response will then write on each copy the word "complete," the time, and his last name in full, and will then deliver a copy to each person included in the address, except enginemen, and each must read his copy aloud to the operator. The copy for each engineman must be delivered to him personally by the conductor, and the engineman must read it aloud to the conductor, and understand it before acting upon it.

"Com-
plete" to
superior
train first.

460. For an order preceded by the signal "31," "complete" must not be given to the order for delivery to a train of inferior right, until "O K" has been given to and acknowledged by the operator who receives the order for the train of superior right. Whenever practicable, the signature of the conductor of the train of superior right must be taken to the order and "complete" given before the train of inferior right is allowed to act on it.

Treated as
holding or-
der.

After "O K" has been given and acknowledged, and before "complete" has been given, the order must be treated as a holding order for the train addressed, but must not be otherwise acted on until "complete" has been given.

Void if line
fails.

If the line fails before an office has received and acknowledged "O K" to an order preceded by the signal "31" the order at that office is of no effect, and must be there treated as if it had not been sent.

461. (Omitted.)

462. (Omitted.)

463. The order, the "O K" and the "complete" must each, in transmitting, be preceded by "31" and the number of the order, thus "31, No. 10." In transmitting the signature of a conductor it must be preceded by "31," the number of the order, and the train number, thus, "31, No. 10, Train No. 5." After each transmission and response the sending operator must give his office signal.

464. The operator who receives and delivers an order must preserve the lowest copy. On this must appear the signatures of those who sign for the order, and on it he must record the time when he receives it; the responses; the time when they are received; his own name; the date and the train number, for which places are provided in the blanks. These copies must be sent to the Superintendent.

Operator's
Copy.

465. (Omitted.)

466. (Omitted.)

467. For orders delivered at the Superintendent's office the requirements as to record and delivery will be the same as at other points.

Orders at
Superin-
tendent's
office.

468. Orders to persons in charge of work requiring the use of track in yards or at other points, authorizing such use when trains are late, must be delivered in the same way as to conductors of trains.

469. An order to be delivered to a train at a point not a telegraph station, or while the office is closed, must be addressed to

Orders at
non-tele-
graph sta-
tions.

"*C. and E., No. — (at —), care of —,*"
and forwarded and delivered by the conductor or

other person in whose care it is addressed. "Complete" will be given upon the signature of the person by whom the order is to be delivered, who must be supplied with copies for the conductor and engineman addressed, and a copy upon which he shall take their signatures. This copy he must deliver to the first operator accessible, who must preserve it, and at once advise the train dispatcher of its having been received.

Orders so delivered to a train must be compared by those receiving them with the copy held by the person delivering and acted on as if "complete" had been given in the ordinary way.

Orders must not be sent in the manner herein provided to trains the rights of which are thereby restricted.

470. When a train is named in an order, all its sections are included, unless particular sections are specified, and each section included must have copies addressed and delivered to it.

471. Meeting orders must not be sent for delivery to trains at the meeting point if it can be avoided. When it cannot be avoided special precautions must be taken by the train dispatchers and operators to insure safety.

There should be, if possible, at least one telegraph office between those at which opposing trains receive meeting orders.

An operator must not acknowledge the receipt of an order for a train that is at his station, the engine of which has passed his train order signal, until he has personally notified the conductor and engineman that he has orders for them.

Orders for each section.

Meeting Orders.

Orders should not be sent an unnecessarily long time before delivery, or to points unnecessarily distant from where they are to be executed. No orders (except those affecting the train at that point) should be delivered to a freight train at a station where it has much work until after the work is done.

NOTE.—Conductors and enginemen must not pass a definite meeting point without knowing positively that the train or trains met are the ones referred to in the order.

472. A train, or any section of a train, must be governed strictly by the terms of orders addressed to it and must not assume rights not conferred by such orders. In all other respects it must be governed by the Train Rules and Time-tables.

Governed strictly by orders.

473. Orders once in effect continue so until fulfilled, superseded, or annulled.

Orders in effect until fulfilled, etc.

Where more than one movement is included in an order, any part of the order specifying a particular movement may be superseded.

Orders held by or issued for a regular train are annulled when such train has lost its rights, as provided by Rules 320 and 407, and other trains will be governed accordingly.

474. A fixed signal must be used at each train-order office, which shall display red at all times when there is an operator on duty, except when changed to white to allow a train to pass after getting orders, or for which there are no orders.

Fixed signals.

While red is displayed, all trains must come to a full stop, and any train thus stopped must

not proceed without receiving an order addressed to such train, or a clearance card on a specified form stating over the operator's signature that he has no orders for it. Operators must be prepared with other signals to use promptly if the fixed signals should fail to work properly. If a signal is not displayed at a night office, trains which have not been previously notified must stop and enquire the cause, and report the facts to the Superintendent from the next open telegraph office.

When a semaphore is used, the arm means red when horizontal, and white when in an inclined position.

NOTE.—Conductors and enginemen must promptly report all cases of absence of station signal where one is usually shown, and agents and operators must report any cases of running by or disregard of signals on the part of enginemen.

Should a train for which there are no orders be stopped by a fixed signal, such train must be given a clearance card.

Reporting
trains.

475. Operators will promptly record and report to the Superintendent the time of departure of all trains and the direction in which extra trains are moving. They will record the time of arrival of trains and report it when so directed.

Designation
of
trains.

476. Regular trains will be designated in orders by their schedule numbers, as "No. 10," or "2d No. 10," adding engine numbers if desired; extra trains by engine numbers, as "Extra 798"; and all other numbers by figures. The direction of the movement of extras will be added when necessary, as "East," or "West." Time will be stated in figures only.

477. The following signs and abbreviations may be used: Abbreviations.

Initials for Superintendent's signature.

Such office and other signals as are arranged by the Superintendent.

C & E—for Conductor and Engineman.

O K—as provided in these rules.

Min—for Minutes.

Junc—for Junction.

Frt—for Freight.

No—for Number.

Eng—for Engine.

Sec—for Section.

Opr—for Operator.

9—to clear the line for Train Orders, and for Operators to ask for Train Orders.

31—for Train Order as provided in the rules.

The usual abbreviations for the names of the months and stations.

NOTE.—Transfers of orders from one dispatcher to another must be in writing in a book provided for that purpose, dated and timed, with complete list, referring to numbers, of unexpired orders; or, if done by telegraph, the above must be transmitted, an understanding returned, and "complete" given, before the authority is exercised by another person.

An operator at a station, going off duty and having unexpired orders in hand, will transfer them, referring to numbers, to the relief operator, taking his receipt therefor.

FORMS OF TRAIN ORDERS.

Form A.—Fixing Meeting Point for Opposing Trains.

_____ and _____ will meet at _____.

EXAMPLES.

No. 1 and No. 2 will meet at Bombay.

No. 3 and 2d No. 4 will meet at Siam.

No. 5 and Extra 95 will meet at Hong Kong.

Extra 652 North and Extra 231 South will meet at Yokohama.

Trains receiving this order will, with respect to each other, run to the designated point, and having arrived there will pass in the manner provided by the Rules.

Form B.—Authorizing a Train to Pass or Run Ahead of Another Train Running in the Same Direction.

(1.) _____ will pass _____ at _____.

(2.) _____ will run ahead of _____, _____ to _____.

EXAMPLES.

(1.)—No. 1 will pass No. 3 at Khartoum.

(2.)—No. 4 will run ahead of No. 6 Bengal to Madras.

When under this order a train is to pass another, both trains will run according to rule to the designated point and there arrange for the rear train to pass promptly.

Form C.—Giving a Train of Inferior Right the Right of Track Over an Opposing Train of Superior Right.

_____ has right of track over _____ _____ to _____.

EXAMPLES.

(1.)—No. 2 has right of track over No. 1 Mecca to Mirbat.

(2.)—Extra 37 has right of track over No. 3 Natal to Ratlam.

This order gives a train of inferior right the right of track over one of superior right, to a designated point.

If the trains meet at the designated point, the train of inferior right must take the siding, unless the rules or orders otherwise indicate.

Under this order, as illustrated by example (1), if the train of superior right reaches the designated point before the other arrives it may proceed, provided it keeps clear of the schedule time of the train of inferior right as many minutes as the inferior train was before required by the train rules to keep clear of the superior train.

If the train of superior right, before meeting, reaches a point beyond that named in the order, the conductor must stop the other train where it is met and inform it of his arrival.

Under example (2) the train of superior right cannot go beyond the designated point until the extra train arrives.

When the train of inferior right has reached the designated point, the order is fulfilled, and the train must then be governed by time-table and train rules or further orders.

The following modification of this form of order will be applicable for giving a work train the right of track over all other trains, in case of a wreck or break in the track.

EXAMPLE.

Work Train Extra 275 has right of track over all trains between Stockholm and Edinburgh from 7 p. m. _____

This gives the work train the exclusive right of the track between the points designated.

Form D.—Giving all Regular Trains the Right of Track Over a Given Train.

All regular trains have right of track over _____ between _____ and _____.

EXAMPLE.

All regular trains have right of track over No. 1 between Moscow and Berlin.

This order gives to any regular train of inferior right receiving it the right of track over the train named in the order, and the latter must clear the schedule times of all regular trains, the same as if it were an extra.

Form E.—Time Orders.

- (1.) _____ will run _____ late _____ to _____.
- (2.) _____ will wait at _____ until _____ for _____.

EXAMPLES.

(1.)—*No. 1 will run 20 min. late Joppa to Mainz.*

(2.)—*No. 1 will wait at Muscat until 10 a. m. for No. 2.*

Form (1) makes the schedule time of the train named, between the points mentioned, as much later as the time stated in the order, and any other train receiving the order is required to run with respect to this later time, the same as before required to run with respect to the regular schedule time. The time in the order should be

such as can be easily added to the schedule time.

Under Form (2) the train of superior right must not pass the designated point before the time given, unless the other train has arrived. The train of inferior right is required to run with respect to the time specified, the same as before required to run with respect to the regular schedule time of the train of superior right.

Form F.—For Sections of Regular Trains.

_____ will carry signals _____ to _____ for _____

EXAMPLES.

No. 1 will carry signals Astrakhan to Cabul for Eng. 85.

2d No. 1 will carry signals London to Dover for Eng. 90.

This may be modified as follows:

Engines 70, 85 and 90 will run as 1st, 2d and 3d sections of No. 1, London to Dover.

For annulling a section:

Eng. 85 is annulled as 2d section of No. 1 from Chatham.

If there are other sections following add:

Following sections will change numbers accordingly.

The character of a train for which signals are carried may be stated. Each section affected by the order must have copies, and must arrange signals accordingly.

Form G.—For Arranging a Schedule for an Extra Train.

(1.) Eng. — will run extra, leaving — on — on the following schedule, and will have the right of track over all trains:

Leave —.

Arrive —.

EXAMPLE.

(1.) *Eng. 77 will run extra, leaving Turin on Thursday, Feb. 17th, on the following schedule, and will have the right of track over all trains:*

Leave Turin 11:30 p. m.

" Pekin 12:25 a. m.

" Canton 1:47 a. m.

Arrive Rome 2:22 a. m.

Example (1) may be varied by specifying particular trains over which the extra shall or shall not have right of track, and any train over which the extra is thus given the right of track must clear its time as many minutes as such train is required to clear the schedule time of a first-class train.

Form H.—Extra Trains.

— will run extra — to —.

EXAMPLE.

(a.) *Eng. 99 will run extra Berber to Gaza.*

A train receiving an order to run extra is not required to guard against opposing extras, unless directed by order to do so, but must keep clear of all regular trains, as required by rule.

A "work train" is an extra, for which the above form will be used for a direct run in one direction. The authority to occupy a specified

portion of the track, as an extra while working, will be given in the following form:

(b.) *Eng. 292 will work as an extra 7 a. m. until 6 p. m. between Berne and Turin.*

The working limits should be as short as practicable, to be changed as the progress of the work may require. The above may be combined, thus:

(c.) *Eng. 292 will run extra Berne to Turin, and work extra 7 a. m. until 6 p. m. between Turin and Rome.*

When an order has been given to "work" between designated points, no other extra must be authorized to run over that part of the track without provision for passing the work train.

When it is anticipated that a work train may be where it cannot be reached for meeting or passing orders, it may be directed to report for orders at a given time and place, or an order may be given that it shall clear the track for (or protect itself after a certain hour against) a designated extra by adding to example (b) the following words:

(d.) *And will keep clear of (or protect itself against) Extra 223, south, between Antwerp and Brussels after 2:10 p. m.*

In this case Extra 223 must not pass the northernmost station before 2:10 p. m., at which time the work train must be out of the way, or protecting itself (as the order may require) between those points.

When the movement of an extra train over the working limits cannot be anticipated by these or other orders to the work train, an

order must be given to such extra, to protect itself against the work train in the following form:

(e.) *Extra 76 will protect itself against work train extra 95 between Lyons and Paris.*

This may be added to the order to run extra.

A work train when met or overtaken by an extra must allow it to pass without unnecessary detention.

When the conditions are such that it may be considered desirable to require that work trains shall at all times protect themselves while on working limits, this may be done under the following arrangements. To example (b) add the following words:

(f.) *protecting itself against all trains.*

A train receiving this order must, whether standing or moving, protect itself within the working limits (and in both directions on single track) against all trains, in the manner provided in Rule 399.

When an extra receives orders to run over working limits it must be advised that the work train is within those limits by adding to example (a) the words:

(g.) *Eng. 292 is working extra between Berne and Turin.*

A train receiving this order must run expecting to find the work train protecting itself within the limits named.

Form J.—Holding Order.

Hold _____ at _____.

EXAMPLES.

- (1.) *Hold No. 2 at Berlin.*
- (2.) *Hold all trains east at Berlin.*

As any order for which "O K" has been given and acknowledged operates as a holding order for the train to which it is addressed, this form will only be used in special cases, to hold trains until orders can be given, or for some other emergency. The reason for holding may be added, as "for orders."

This order is not to be used for holding a train, while orders are given to other trains against it, which are not at the same time given to it in duplicate. It must be respected by conductors and enginemen of trains thereby directed to be held as if addressed to them. Conductors when informed of the order must sign for it and their signatures must be sent and "complete" obtained.

When a train has been so held it must not go until the order to hold is annulled, or an order is given in the form:

"_____ may go."

This must be addressed to the person or persons to whom the order to hold was addressed and must be delivered in the same manner.

Form K.—Annuling a Scheduled Train.

_____ of _____ is annulled.

EXAMPLES.

- (1.) *No. 1 of Feb. 29th is annulled.*
- (2.) *No. 3 due to leave Naples Saturday, Feb. 29th, is annulled.*

Adding "from Alaska," or "between Alaska and Halifax," when appropriate.

This order takes away all rights of the train annulled and authorizes any train or person receiving it to use the track as if the train annulled were not on the Time-table.

If a train is annulled to a point named, its rights beyond that point remain unaffected.

The train dispatcher may direct any operator to omit repeating back an order annulling a train, until he has occasion to deliver it.

When a train has been annulled it must not be again restored under its original number by special order.

Form L.—Annulling or Superseding an Order.

“Order No. — is annulled.”

This will be numbered, transmitted, and signed for as other orders.

If an order which is to be annulled has not been delivered to a train, the annulling order will be addressed to the operator, who will destroy all copies of the order annulled but his own, and write on that:

Annulled by order No. —.

An order superseding another may be given, adding “*this supersedes order No. —,*” or adding “*instead of —.*”

EXAMPLE.

No. 1 and No. 2 will meet at Sparta instead of at Thebes.

An order that has been annulled or superseded must not be again restored by special order under its original number.

In the address of an order annulling or superseding another order, the train first named must be that to which rights were given by the order annulled or superseded, and when the order is not transmitted simultaneously to all concerned, it must be sent to the point at which that train is to receive it, and the required response first given, before the order is sent for other trains.

SPEED TABLE.

Speed per Hour.	Time of performance.			Speed per Hour.	Time of performance.		
	¼ Mile	½ Mile	1 Mile		¼ Mile	½ Mile	1 Mile
MILES	M. S.	M. S.	M. S.	MILES	M. S.	M. S.	M. S.
1	15 0	30 0	60 0	31	0 29	0 58	1 56
2	7 30	15 0	30 0	32	0 28	0 56	1 52
3	4 0	10 0	20 0	33	0 27	0 54	1 49
4	3 45	7 30	15 0	34	0 26	0 53	1 45
5	3 0	6 0	12 0	35	0 25	0 51	1 42
6	2 30	5 0	10 0	36	0 25	0 50	1 40
7	2 8	4 17	8 34	37	0 24	0 48	1 37
8	1 52	3 45	7 30	38	0 23	0 47	1 34
9	1 40	3 20	6 40	39	0 23	0 46	1 32
10	1 30	3 0	6 0	40	0 22	0 45	1 30
11	1 21	2 43	5 27	41	0 21	0 43	1 27
12	1 15	2 30	5 0	42	0 21	0 42	1 25
13	1 9	2 18	4 37	43	0 20	0 41	1 23
14	1 4	2 8	4 17	44	0 20	0 40	1 21
15	1 0	2 0	4 0	45	0 20	0 40	1 20
16	0 56	1 52	3 45	46	0 19	0 39	1 18
17	0 52	1 46	3 31	47	0 19	0 38	1 16
18	0 50	1 40	3 20	48	0 18	0 37	1 15
19	0 47	1 34	3 9	49	0 18	0 36	1 13
20	0 45	1 30	3 0	50	0 18	0 36	1 12
21	0 42	1 25	2 51	51	0 17	0 35	1 10
22	0 40	1 21	2 43	52	0 17	0 34	1 9
23	0 39	1 18	2 36	53	0 17	0 34	1 7
24	0 37	1 15	2 30	54	0 16	0 33	1 6
25	0 36	1 12	2 24	55	0 16	0 32	1 5
26	0 34	1 9	2 18	56	0 16	0 32	1 4
27	0 33	1 6	2 13	57	0 15	0 31	1 3
28	0 32	1 4	2 8	58	0 15	0 31	1 2
29	0 31	1 2	2 4	59	0 15	0 30	1 1
30	0 30	1 0	2 0	60	0 15	0 30	1 0

LAMP AND HAND SIGNALS.

See Rules 359 to 363, page 45.



STOP.



GO AHEAD.



BACK UP.



TRAIN HAS PARTED.

GENERAL DESCRIPTION OF SIGNALS

USED IN CONNECTION WITH

Automatic and Interlocking Switch and Signal
Plants,

—AND—

Rules Governing the Movement of Trains Controlled
by Such Signals.

AUTOMATIC BLOCK SIGNALS.

Disc Type.

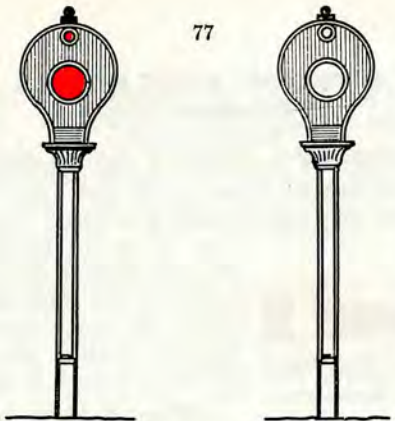
DESCRIPTION.

These signals indicate danger by displaying a red disc by day, and a red light by night. The absence of the disc by day, or a white light displayed by night, indicates safety.

A small portion of the red disc will be visible when the signal is at safety, at the upper left hand edge of the opening in the signal case, and serves to show that the disc is there, and connected with the signal instrument.

The signals are, as a rule, but not always, located on the right of the track they govern.

All signals, Interlocking and Automatic, will be numbered with odd numbers governing east-bound tracks, those with even numbers governing west-bound tracks.



DANGER—Stop.

CLEAR—Proceed.

SIGNALS—Disc Type.

RULES.

701. When a signal indicates danger, run quite up to the signal, but **never** beyond it; if it remains at danger proceed under Rule 706.

702. When a signal indicates safety, proceed at speed.

703. If the disc of the signal is covered by a black board, or black cloth, it indicates that the signal is out of service, and trains may proceed on their rights, taking all needful precautions to avoid accidents.

704. Enginemen must not allow either fire box or front end cinders to be dropped on the tracks that are governed by Automatic or Interlocking Signals.

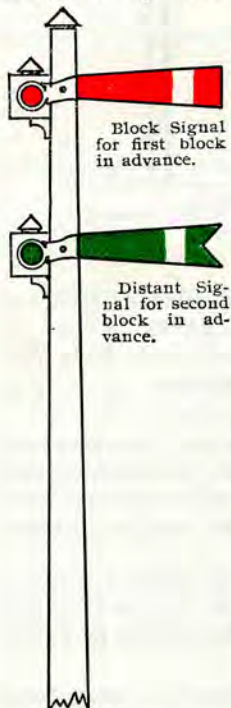
705. When a train is obliged to stop for a block signal, and there is no apparent cause for the signals standing at danger, the enginemen will report the fact to the Superintendent by wire, from the first regular stopping place where there is a telegraph office, giving the number or location of the signal causing the stop.

AUTOMATIC BLOCK SIGNALS.

Semaphore Type.

DESCRIPTION.

The signals used are of the regular semaphore pattern of High Block and Distant Signals, the top blade being the block signal for first block in advance; a Distant Signal may be located on the same post and below the block signal, being the caution signal for the second block in advance.



SIGNALS—
SEMAPHORE TYPE.

When a train enters a block the signals for which are "clear," it will automatically set those signals at "danger" and "caution" and will keep them in that position until the last pair of wheels has passed out of the block when the block signal will return to "clear," the distant signal, however, remaining at "caution" until the block signal of the succeeding block returns to "clear" when it also will return to the clear position if the block signal above it shall have remained clear, otherwise it will remain at "caution."

All main track switches are connected with the signals of the blocks in which they are located, and will cause these signals to stand at danger unless the switch is set for the main track, in which case, if there is no train on the main track in that block,

or other obstructions, the signal will return to "clear," otherwise it will remain at danger.

Block signals at danger may mean—1st. A train is in the block. 2d. An open switch in the main track. 3d. A car outside of the clearance point at a siding. 4th. A broken rail. 5th. An open drawbridge.

Automatic signals are those which are put to danger by a train moving or standing in the block—by a switch being open, by a rail being broken, or by a car standing outside of the clearance point at a siding, and are placed on posts painted a light drab color.

RULES.

706. When a block signal indicates danger, run quite up to the signal, but **never** beyond it. Should the block signal remain at danger, trains will, after waiting time specified by special rules on time table, but in no case less than two minutes, proceed with caution up to the next signal, looking out for all sources of danger. Where such signal, remaining at danger, governs the movement of trains over railroad crossings and drawbridges, the conductor or person in charge of engine or train must send a man ahead to such crossing or drawbridge before passing over same with his train.

707. When signals indicate caution, proceed with train under control, prepared to stop at the next block signal if it is found at danger.

708. When signals indicate safety, proceed at speed.

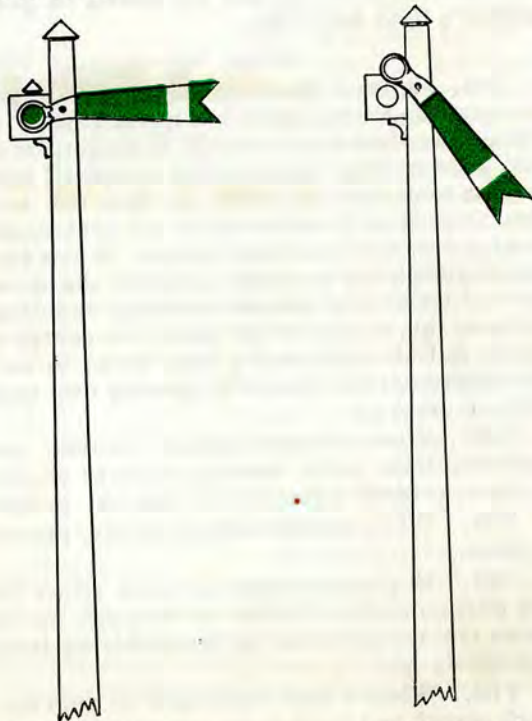
709. Enginemen must not allow either fire box or front end cinders to be dropped on the tracks that are governed by automatic or interlocking signals.

710. When a train is obliged to stop for a block signal, and there is no apparent cause for

the signals standing at danger, the enginemen will report the fact to the Superintendent by wire, from the first regular stopping place where there is a telegraph office, giving the number or location of the signal causing the stop.

DISTANT SIGNAL.

The Distant Signal is governed by the block signal next in advance of it and has an arm which is forked at the end, and is painted green on its face.



CAUTION—Run slowly.

CLEAR—Proceed.

When the arm is in a horizontal position, or a green light is displayed, it indicates "**Caution—proceed with train under control**"; but train must stop before engine reaches block signal, unless same indicates "**safety.**"

When the arm is inclined downward, or a white light is displayed, it indicates "**Safety—proceed to block signal.**"

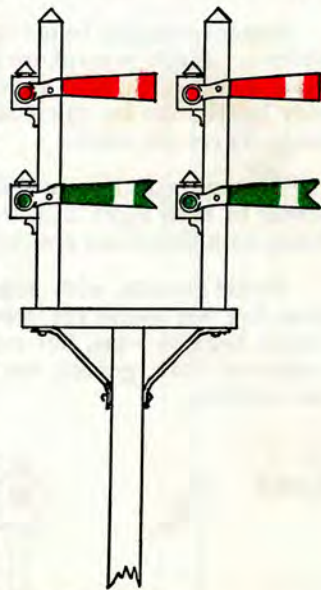
On double track the high semaphores, as a rule (but not always), are located on the right hand and adjoining the track governed.

On single track, as a rule (but not always), they are located on the right hand side of and adjoining the main track.

When an overhead bridge is used, the signals are located over the track they govern.

BRACKET POST.

When there are two or more tracks used in the same direction the semaphores are placed on a bracket post on the right hand side of the track and in the same relative position as the tracks which they govern.



Bracket Post.

INTERLOCKING SIGNALS.

DESCRIPTION.

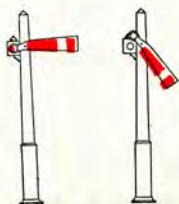
Interlocking Signals are those controlled by a towerman and are placed on posts painted red.

The signals commonly used are of the semaphore pattern, which consist of a post and arm pointing to the right for all trains whose movement they govern. The positions of the arm, or the color of the light displayed, indicate **caution, danger** or **safety**.

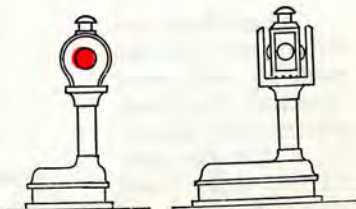
Semaphores may be of the high or low (dwarf) pattern. High semaphore arms stand not less than fifteen (15) feet above the track. They may be on posts by the side of the track, or on bridges over the track.

They govern the movement of trains on main tracks in their right direction only. On single track both directions are right directions.

Dwarf Signals, with arms standing not more than five feet above the track, and Pot Signals which have no arms, but vanes revolving around a vertical shaft, govern the movement of trains in switching.



DANGER—Stop. CLEAR—Proceed.
DWARF SIGNALS.

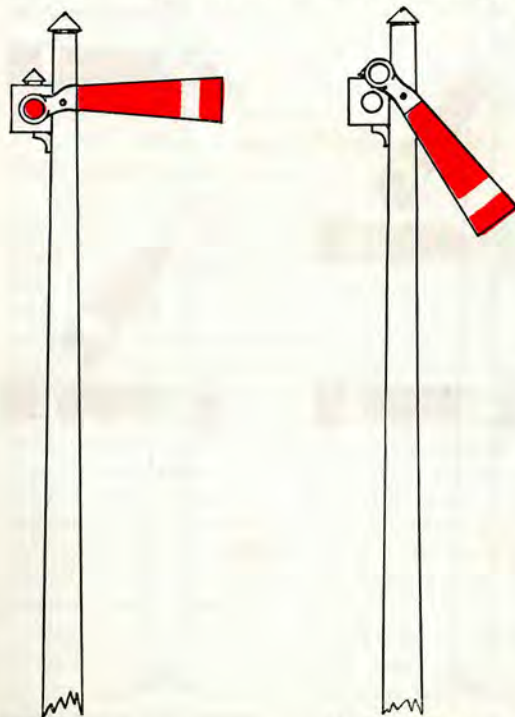


DANGER—Stop. CLEAR—Proceed.
POT SIGNALS.

HIGH HOME SIGNAL.

The Home Signal is usually placed nearly opposite a derailing switch, about 300 feet from the fouling point, and has an arm with the end squared, and painted red on its face.

When the arm is in a horizontal position, or a red light is displayed, it indicates "**Danger—stop.**" Do not proceed until signal indicates "**safety,**" except as provided in Rule 803. When



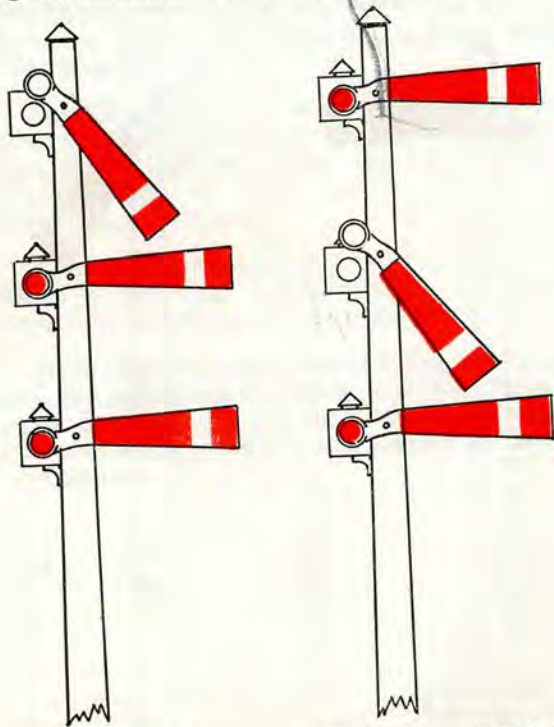
DANGER—Stop.

CLEAR—Proceed.

the arm is inclined downward, or a white light is displayed, it indicates "safety-go ahead."

MORE THAN ONE ARM ON HIGH HOME SIGNAL POST.

When there is more than one arm on the High Home Signal Post, the higher arm governs the movement of trains along the main track or high speed route. The next arm below governs



Main line or high speed route clear.

First diverging route to right or left clear.

the movement of trains into the first diverging track to right or left beyond the signal. In all cases the lowest arm governs movement of trains into all diverging tracks to right or left not provided for by other signals.

At a junction the arms will be arbitrarily assigned by special rules on time-tables to the routes they govern.

When two or more Pot Signals stand in line one above the other, they will govern the movement of trains as provided above for High Home Signals.

RULES.

801. Run quite up to a signal, but *never* beyond it when at danger.

802. When a signal shows danger, trains must come to a full stop.

803. When interlocking signals controlling the movement of trains over certain portions of the track become temporarily inoperative, trains may be moved by hand signals given by towerman or other competent authority; but the hand signals so given are good only for the movement of trains to the next signal. In such cases, engineers will proceed with great care, looking out for all sources of danger. When hand signals are given as above for trains to pass fixed signals at danger, in cases where such signals govern the movement of trains over railroad crossings and drawbridges, the conductor or person in charge of engine or train must send a man ahead to such crossing or drawbridge before passing over same with his train.

804. After a signal is given for a movement in one direction, a movement must not be made in the opposite direction without receiving permission by the proper signal.

805. Trains or cars must not be left standing over the detector bars or circuits at switches or derails, as they will prevent the operation of the switches and signals.

806. Enginemen must not allow sand or water to run while passing over switches and detector bars at interlocking points.

807. No flying switches must be made where movements are controlled by interlocking mechanism.

808. All trainmen must obey promptly the signals and orders of towermen at points which are interlocked, all movements at such points being entirely under the control of the towerman. (See Rule 803.)

CROSSING GATES AND SIGNALS.

Engineers will observe carefully when passing a crossing equipped with an automatic bell, to see if the bell is ringing, and will report to the Superintendent by wire from next telegraph office when any bell is found not ringing.

Engineers passing crossings, equipped with crossing gates will take care to see if they are lowered into proper position for closing the crossing before the engine reaches them, and will report at end of run to Superintendent any gates found not properly closed.

INSTRUCTIONS

GOVERNING THE USE AND CARE OF THE

Westinghouse Automatic Air-Brakes

—AND—

BAKER HEATERS.

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SOUTHERN PACIFIC COMPANY.

RULES

FOR THE USE OF

THE WESTINGHOUSE AUTOMATIC AIR-BRAKE.

GENERAL INSTRUCTIONS.

The Air-brake system in use on the Southern Pacific Company's lines is that known as the **New Automatic** or "**Quick-action**" brake.

It should always be kept in mind that this brake cannot be changed to, and used as, "straight air." Owing to the addition of the quick-action valve, a four-way cock cannot be placed in the triple; consequently nothing but the automatic can be used with this style triple valve.

1. In making up trains, all couplings must be united so that the brakes will apply throughout the entire train. The cocks in the brake pipe must be opened, except that on the rear of the last car, which must be closed.

In coupling hose, place the coupling shoulders near the stop pin firmly together; then roll the heads in place as if they turned on a pivot, firmly pressing the heads toward each other, until both heads strike the stop pins.

2. In detaching engines or cars, the coupling must invariably be parted by hand. The stop cocks in brake pipes

must always be closed before separating the couplings, to prevent application of brakes. Before detaching the engine, or any cars, the brakes should be fully released on the whole train, except on heavy grades. The air should be fully released from cars to be set out from trains on sidings, and hand brakes used.

3. When air hose is not coupled between cars it must in every case be coupled to the dummy couplings provided on all passenger cars for that purpose, to prevent injury to the hose, or admission of dirt to train pipe. This is very important and must not be neglected.

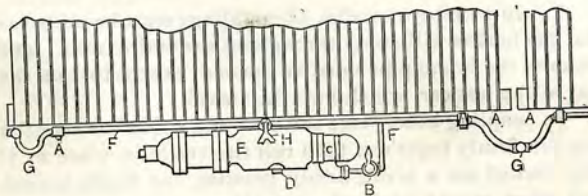
4. If the brakes become set, when engine is not attached to train, or brakes should "stick" in train, they can be released, on passenger cars, by opening the air-release cock in each auxiliary reservoir; and on freight cars by opening release cock (*h*) in auxiliary reservoir (see cut).

5. The following cuts show the different positions for handle of triple valve, when brakes are being used "Automatic" or "Cut-out."

PERPENDICULAR POSITION, HANDLE UP.

"AUTOMATIC."

The new style air-brake for freight cars—"Automatic."

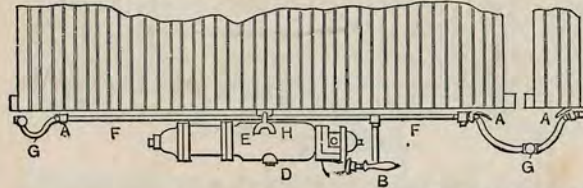


EXPLANATION.—*A*, stop cocks in main-brake pipe; *B*, cut-out cock handle; *C*, triple valve; *D*, drain plug in auxiliary reservoir; *E*, auxiliary reservoir; *F*, main-brake pipe; *G*, hose and couplings; *H*, release valve in auxiliary reservoir.

HORIZONTAL POSITION, HANDLE LEVEL.

"CUT-OUT."

The new style air-brake for freight cars—"Cut-out."

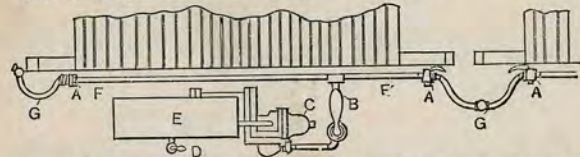


EXPLANATION.—*A*, stop cocks in main-brake pipe; *B*, cut-out cock handle; *C*, triple valve; *D*, drain plug in auxiliary reservoir; *E*, auxiliary reservoir; *F*, main-brake pipe; *G*, hose and couplings; *H*, release valve in auxiliary reservoir.

PERPENDICULAR POSITION, HANDLE UP

"CUT-OUT."

The new style air-brake for passenger cars—"Cut-out."

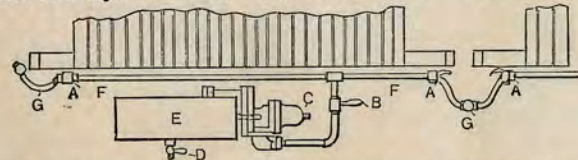


EXPLANATION.—*A*, stop cocks in main-brake pipe; *B*, cut-out cock handle; *C*, triple valve; *D*, release cock in auxiliary reservoir; *E*, auxiliary reservoir; *F*, main-brake pipe; *G*, hose and couplings.

HORIZONTAL POSITION, HANDLE LEVEL.

"AUTOMATIC."

The new style air-brake for passenger cars—"Automatic."



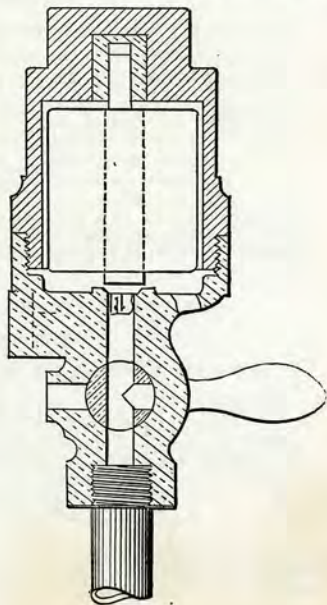
EXPLANATION.—*A*, stop-cocks in main-brake pipe; *B*, cut-out cock handle; *C*, triple valve; *D*, release cock in auxiliary reservoir; *E*, auxiliary reservoir; *F*, main-brake pipe; *G*, hose and couplings.

PRESSURE-RETAINING VALVES.

6. This valve is attached to each car, and connected by a small pipe to the release port side of the triple valve, and is used only when descending mountain grades. The object of this valve is to retain a portion of the pressure in brake cylinder while the auxiliary reservoirs are being recharged in descending heavy grades, thus keeping the speed of the train under control, and allowing the engineman sufficient time to recharge.

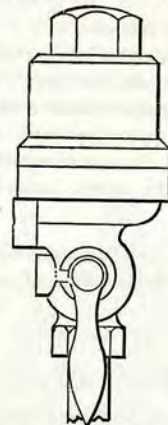
7. In operating the pressure-retaining valves, the handle of same must be placed horizontally (see cut); and ten pounds pressure of air is retained on the brakes by means of the weighted valve contained in the valve case, which has to be lifted whenever any of the air pressure is exhausted.

SECTIONAL VIEW
- OF -
PRESSURE-RETAINING
VALVE.



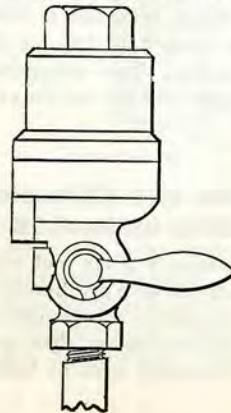
The small openings in the body of the pressure-retaining valves serve as air-exhaust passages, and must always be kept open.

PRESSURE-RETAINING VALVE OPEN.



8. Cut out the pressure-retaining valve by placing the handle down, or in perpendicular position, which allows the entire pressure to escape from the brake cylinder, in which position it must always remain on level track, or when ascending grades (see cut).

PRESSURE-RETAINING VALVE CLOSED.



9. The adjustment of brake gear should be such that when brakes are fully on, the pistons of brake cylinders will have a travel of 7 inches.

Great care must be exercised, when taking up the slack in the brake connections, to have the levers and pistons *pushed back in their proper places* and the slack taken up by the under connections, or dead levers. If the pistons have a uniform travel, the working of each brake in train will be practically the same, insuring the best general results.

10. In cold weather, the triple valve should be drained frequently, to admit of discharge of condensation that may have collected.

BREAK-IN-TWO OF TRAIN.

11. In case a train breaks in two, the brakeman should **close the stop cock on the rear car** of the part of train remaining attached to the engine, when he reaches it, and then give the engineman signal to let the brakes off. When cars are again properly coupled up, before opening the air into the rear end of train, the brakeman should give the engineman signal to set brakes, which should be done strong, and left on until brakeman opens the air cocks into the rear section of train; when this is done, the engineman will have regained control of the air in entire train, as before the break-in-two. This action will save valuable time, which otherwise may be lost in releasing the air on each car by hand.

DESCRIPTION OF ENGINEMAN'S BRAKE AND EQUALIZING DISCHARGE VALVE.

12. The engineman's brake and equalizing discharge valve, sectional cuts of which are herein shown, is a device designed especially to assist the engineman in operating train brakes in a more perfect manner than has heretofore been possible with the three-way cock or brake valves formerly

used for this purpose, without much personal skill from the operator.

13. It is of the greatest importance to perfect train braking that a gradual exhaust or discharge of air pressure from the train pipe in applying the brakes should be made under ordinary conditions of station stopping, and a gentle closing or stopping of this exhaust in order to thoroughly

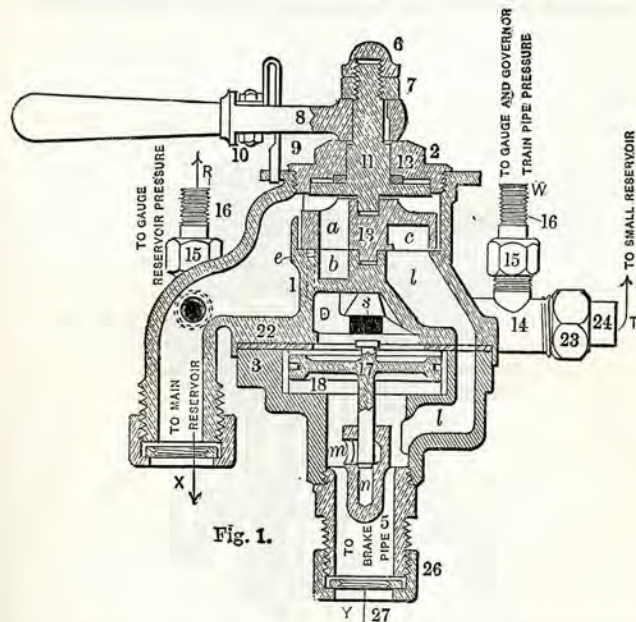


Fig. 1.

equalize the pressure that may yet remain in the train pipe, thus preventing the release of some of the front brakes of the train, which may occur by the abrupt opening and closing of the three-way cock, causing a violent surge of air from the rear to the front end of the train, affecting the brakes as stated. The brake valve here illustrated entirely prevents this, and *mechanically measures the required*

volume of air to be discharged from the train pipe when applying the brakes for ordinary stoppages, and is equally efficient on short or long trains. Large openings are provided in its construction for the instantaneous application of the brakes in an emergency.

14. It is absolutely essential in operating the brakes upon long trains, and is of great importance on short ones, to store a pressure of air in the main reservoir on the engine

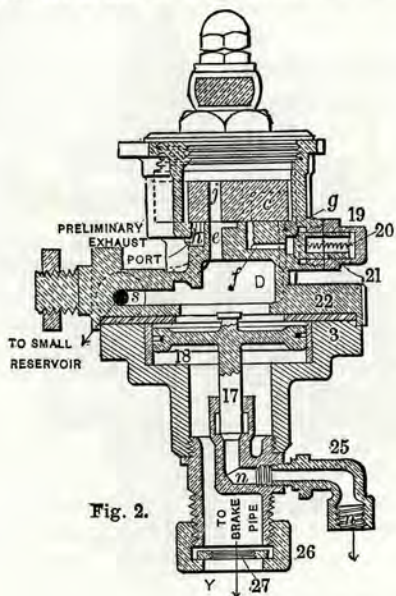


Fig. 2.

of from twenty to twenty-five pounds greater than the train-pipe and auxiliary-reservoir pressure, that will, when discharged into the train-pipe, insure the prompt release of all the brakes. The absence of "excess" pressure in the main reservoir, or improper handling of the brakes, will sometimes retard their release, necessitating the partial "bleeding" of auxiliary reservoirs.

15. A full set of engine-brake fixtures includes a pressure gauge having two sets of works, and two indicators on a single dial, which show at a glance the pressure in the main reservoir and train pipe, the connecting pipes being attached to the brake valve at *r* and *w*. The air pipe to the pump governor should also be connected at *w*, the main reservoir pipe at *x*, and the train pipe at *y*.

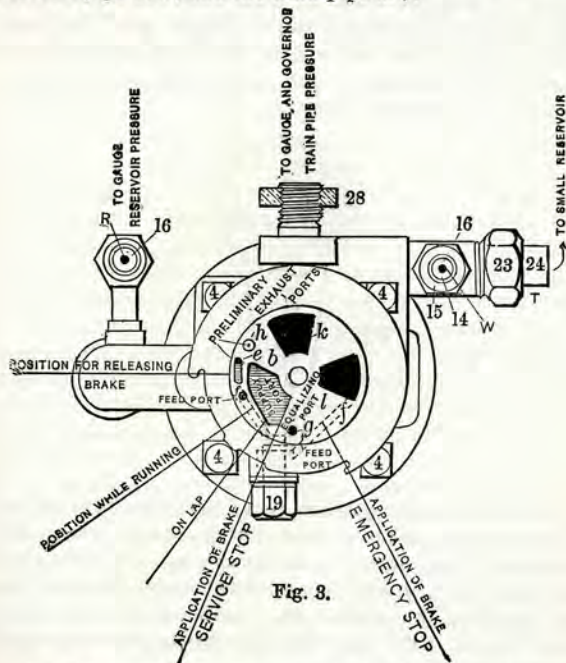


Fig. 3.

16. By preparing a diagram similar to Figure 4, representing the rotary valve 13 and handle 8, of tracing cloth or other transparent material, cutting the ports *a* and *j* out of the diagram on their boundary lines to show *through* openings, and then reversing same and placing it upon the seat of the valve, Figure 3, where it may be rotated at will on a center, the explanation following will be clear.

17. By reference to cuts of the valve on a preceding page, it will be seen that movement of handle δ , on which is located a spring 9 , for guiding it to position, operates "rotary valve" 13 upon its seat, opening and closing the various ports as required.

18. When the handle δ is in "position for releasing brake," air pressure from the main reservoir entering the brake valve at x passes through "supply ports" a and b , thence upward into cavity c , in the under surface of the rotary valve 13 , thence through "direct application and supply port" l to the train pipe at y .

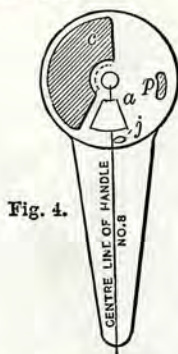


Fig. 4.

While yet in this position, port j in the rotary valve, and port e in its seat, are in communication, the air passing into chamber d , above piston 17 , thence through port s to a small reservoir, which is usually suspended under the right running board of the engine, pipe connections being made therewith at l . This reservoir serves the purpose of increased volume of space to chamber d .

19. The handle δ now being placed in "position while running," direct communication with the train pipe ceases; and port j is brought opposite feed port f , through which main reservoir pressure now passes to the under side of the "feed valve" 21 , which is held to its seat by "feed-valve spring" 20 , having a resistance of about twenty pounds.

When this additional pressure is accumulated in the main reservoir, "feed valve" 21 is forced open, the pressure passing thence through port f to port l and the train pipe, while train-pipe pressure is maintained in chamber d through port l , cavity c and "equalizing port" g , thus equalizing the pressure on top and under piston 17 , the stem of which, forming a valve, is seated in the position shown in "bottom cap" 5 , and permits the escape of air from the train pipe to the atmosphere through ports m and n when raised from its seat.

20. When applying brakes for ordinary or station stops, move handle δ to "on-lap" position. This blanks all ports in the rotary valve and seat. Then moving the valve handle to the position, "application of brakes, service stops," the small exhaust cavity β , in the lower surface of the rotary valve 13 , establishes communication between the two "preliminary-exhaust ports" e and h , the latter leading to the atmosphere; and after discharging about eight pounds pressure, as shown by the gauge, restore the handle to "on-lap" position. This preliminary discharge of air from chamber d will cause the piston 17 and its stem to rise, which operation is followed by a discharge of air from the train pipe to the atmosphere through ports m and n , applying the brakes gently. This discharge of air from the train pipe continues after the valve handle is carried to "on-lap" position (gradually equalizing train-pipe pressure), and until the train-pipe pressure has been reduced slightly lower than that yet remaining in the chamber above the piston, when the latter is forced downward, and its stem to its seat, closing the outlet n , and preventing the further escape of air until the operation is repeated, which may be necessary to apply the brakes with the desired degree of force.

21. To throw off brakes, push handle δ to "position for releasing brakes," causing the excess of air pressure in main reservoir to be discharged into the train pipe, insuring their prompt and certain release.

22. For an "emergency" application of the brakes, push the handle to the extreme right, to position, "appli-

cation of brake, emergency stop." This operation establishes direct communication between the train pipe and the atmosphere, through the "direct application and supply port," *l*, cavity *c*, and the "direct application and exhaust port" *k*, applying the brakes with full force instantly.

23. When handling trains on down grades, let the brake-valve handle remain in full release position, except when applying brakes, which will insure the full and prompt recharging of auxiliary reservoirs under cars.

24. If the engineman's brake valve is to be located against the boiler head, make the bracket of sufficient length to prevent injury to gaskets by heat.

25. It is of the utmost importance that *direct connections be made from the engineman's brake valve to the main reservoir*, instead of tapping the discharge pipe leading from the air pump to main reservoir. The latter practice is dangerous, as a great deal of moisture and oil is discharged into the train-brake system that would otherwise be deposited in the main reservoir, from which it can be drained.

26. A one-inch stop cock should be placed in the train pipe, a short distance below the engineman's brake valve, within convenient reach of the engineman, and should be closed upon all but the head engine of a train where two or more engines are coupled in the same train, in order that the head engine may operate the train brakes.

27. It is important that the pipe connections to the brake valve be perfectly air tight, and that the valve should occasionally be cleaned. The feed valve *21* can be readily removed for cleaning by the engineman by unscrewing cap nut *19*.

ENGINEMEN.

28. Enginemen of passenger trains must avoid making exhibition stops, and must never, except on heavy grades, or in case of necessity, hold the brakes fully applied until the train comes to a full stop, as this causes a reaction in motion of train which is very disagreeable to passengers. This can be avoided ordinarily by releasing brakes gradually before a full stop, so that all the air will be off at the moment stop is made.

No man is fully competent in the use of air brakes who does not study and practice this point; and especially is he incompetent to handle passenger trains.

Freight train brakes should not be released at slower speed than eight miles per hour, to prevent slack of train from running out and breaking train apart.

29. Frequent breaking of or pulling out drawheads, will, as a rule, be evidence of incompetency or carelessness of enginemen handling the train.

30. On Valley Divisions the standard train pipe pressure will be:

For passenger trains, 70 pounds.

For Freight trains, 60 pounds.

On Mountain Divisions 80 lbs. train pipe pressure will be carried on both freight and passenger trains.

31. Enginemen must know, from personal inspection of engines before leaving round-house, that the air pumps connecting hose and couplings on engine and tender are all in perfect working order. The air pump is then to be started and lubricated for the trip, and maximum pressure pumped up with which to charge the brakes, before engine is coupled to train.

32. After coupling to train, and before leaving a terminal or car-inspection station, the engineman must apply the brakes by gradual reduction to full force, and hold them on while the inspectors go over the train to make sure that all the brakes are set. Upon signal from the inspectors, the

brakes may be released; then wait for the inspectors' report regarding condition and number of brakes, before starting out. Similar precautions must be taken where trains are made up, or cars are taken in or set out of trains at intermediate stations. (See Rule 69.)

33. When starting air pumps, enginemen must allow water of condensation to escape gradually, and not force it out by running the pump with full steam pressure. Start up slowly; increase speed gradually.

34. Steam cylinder of air pump must be kept lubricated with cylinder oil, and air cylinder sparingly lubricated with engine oil. Tallow and lard oils must not be used in the air cylinders.

35. It is important to drain water out of the main reservoir—in summer once a week and in winter daily. Open drip cups in train pipes under tenders frequently. This is especially important in case of engines equipped with the "Sweeney" device.

36. It is of very great importance that every engineman should bear in mind that the air pressure may sometimes reduce slowly, owing to the steam pressure getting low, or from the stopping of the pump, or from a leakage in some of the pipes when one or more cars are detached for switching purposes, and that in consequence it has been found absolutely necessary to provide each brake cylinder with what is called a leakage groove, which permits a slight pressure to escape without moving the piston, thus preventing the application of the brakes when the pressure is slowly reduced, as would result from any of the above causes.

37. It is thus very essential to discharge enough air in the first instance, and with sufficient rapidity, to cause all the leakage grooves to be closed. For ordinary stops, the brakes should be applied lightly by opening the engineman's valve and closing again slowly until the pressure has been reduced on the gauge from four to eight pounds.

38. The brakes are fully applied when the pressure as shown on the gauge is reduced thirty pounds. Any further reduction is a waste of air.

39. When descending heavy grades, regulate the force of brakes so as to maintain a regular and steady speed.

The practice of running long distances on heavy grades before recharging has been found objectionable, as it causes heating of wheels. Trains should be recharged at least every two miles, and oftener if found necessary.

A greater time for recharging is obtained by considerably reducing the speed of the train just before recharging, and by taking advantage of the variations of the grades.

40. Keep the engineman's brake valve in releasing position while recharging, thereby giving the brakes the greatest advantage in recharging quickly. Make no new application of brakes until the full amount of pressure consumed in previous application has been restored. Reduce the pressure as shown on gauge not more than fifteen to twenty pounds from one recharging to another, as it would be difficult to replenish a greater amount in so short a time.

41. Enginemen, upon finding that brakes have been applied by the train men, or by bursting of hose, or by break-in-two of train, must at once aid in stopping the train by placing the engineman's brake valve to "lap" position, thus preventing the escape of air from main reservoir, and be prepared to release brakes immediately on receiving signal.

42. In releasing brakes, the handle of the brake valve must be removed quite *against the stop*, and be kept there for five seconds, and then moved back against the intermediate stop, which is the feed position, and where it must remain while train is running.

43. On a long train, if an engineman's brake valve be opened suddenly and wide, allowing the pressure to escape quickly, the brakes will be set on front end some time before those on rear end, causing a severe shock on train;

then, if engineman's valve be closed quickly without giving time for the pressure to become equalized throughout the entire train, the forward brakes will become released, causing further severe shocks to the train. This mode of handling brakes almost invariably results in drawheads being pulled out and broken. (See Rule 29.)

44. When two engines are coupled to a train, the engineman of the head engine alone must operate and control the train brakes, except in case of accident to brake apparatus on leading engine, when, on signal from the leading engineer, the second engineer will assume control of the train brakes, or assist in recharging, for which contingency the second engineman must at **every moment be prepared to act instantly**; and, having assumed control of the brakes, the second engineman will retain entire charge of same to end of trip, except in case of necessity, which may reverse the operation.

45. Two short, full blasts, followed by one long blast, of the whistle (thus, — — —) is signal that, for some cause, the air on leading engine has failed, and it is desired to give up control to the second engineman, who, by repeating the signal, signifies that he understands and has control of the air-brakes. Two short, full blasts of the whistle repeated three times (thus, -- -- --) is signal that head engineman desires the second engineman's assistance in recharging the train with air.

46. **Have always in mind, on mountain grades, to keep control of the train.**

47. Rule 358, page 45, provides that "Signals of the same number of sounds shall have the same significance when given by other appliances than bell-cords and signal-bells."

48. Enginemen will understand that when train is standing, and test of signal apparatus is being made, either by car inspectors or rear brakemen (see 77 and 92), they are not to whistle for flagmen. Rule 353, page 45, is suspended under these circumstances.

49. The air-signal pipes are intended to carry 40 pounds of air pressure. Signal pipes on engines should be tested at regular intervals in round-houses, to see that reducing valves are all right, and are carrying the proper pressures. Car repairers in passenger yards will give air-signal apparatus the same attention they do the air-brakes.

DRIVER-BRAKES.

50. Adjust the American Driver Brake Shoes so that the piston will have a travel of 6 inches.

On other style of driving brakes the travel should be from $1\frac{1}{2}$ to 2 inches.

51. Any defect in the working of the driver-brake must be reported by engineman promptly.

52. **Engines must not be reversed with driver-brakes set.**

53. On Valley Divisions the driver-brakes must be used in making all stops.

On Mountain Divisions, when descending grade, driver-brakes must be used in conjunction with train brakes, in making all station stops, and in cases of emergency.

A too free use of driver-brakes on mountain grades heats the tires of driving wheels, expands and loosens them on wheel centers, and thus not only destroys their brake efficiency, but renders the engine unfit for draught purposes also.

WATER-BRAKES.

54. The "Le Chatelier," or water-brake, is, on this road, intended to be used as an auxiliary to other brakes, and when used with discretion is a valuable aid in steadying a train down mountain grades. It is most effective on a steady motion of from three to twelve miles per hour, above which latter speed it is of lessened value. It should not be

used at a greater speed than eighteen miles per hour, and is for mountain work only.

OPERATION OF WATER-BRAKE.

55. Water is led by a small pipe connected to the boiler, below water line of same, to the exhaust-pipe cavity, and through to the cylinders. This affords a counter pressure on pistons when engine is reversed, which should be just back of the center notch of quadrant. The act of forcing compressed moist vapor—which the water jet drawn into the cylinders with engine reversed supplies—back into the boiler, causes the retarding force on pistons, operating through the connections on the crank pins, and gives the desired brake power. Only a very small amount of water is used, a portion of which, except that converted into vapor and returned to boiler, passes through the open cylinder cocks. The amount of brake power exerted depends upon the position of the reversed lever.

56. In operating the water-brake, first have the engine in slow motion without steam, have cylinder cocks wide open and keep them open, with reverse lever placed one notch back of the center, and throttle securely shut. Give the small water cock one-eighth of a full turn open, and notice that steam water passes the cylinder cocks freely.

57. The speed may now be regulated by placing the reverse lever back as required, and should be done without any change in the water cock. A too free use of water is dangerous to cylinder heads; and water may be forced out of the smokestack, and does not produce any useful effect.

58. In shutting off water-brake, throw the reverse lever ahead slowly, first closing the water cock, to avoid throwing water from the stack.

59. It must be remembered that the water-brake acts on the drivers, and that the combined use of water and driver brakes will be too great, causing the sliding of wheels;

hence the combined use of water and driving brakes must not be made, except as provided in Rule 61.

60. Light engines, when fitted with air and water brakes, are best controlled by setting the water-brake moderately and using the air-brake to regulate speed.

61. In case of necessity, the water-brake, the air-brake, and all other available means may be used together.

NOTE.—When two engines are coupled to trains descending mountain grades, the engineman not operating the air-brake must assist in retarding speed by using the water-brake to some extent, with the view of preventing flat and heated wheels. The water-brake should not be used at a greater speed than eighteen miles per hour.

THE SWEENEY AIR COMPRESSOR.

62. The Sweeney Air Compressor is a device attached to engines as an auxiliary, to enable engineers to maintain air pressure in train pipes in case of failure of air pump, or in recharging when descending mountain grades.

63. This device consists of a valve and spring to resist a pressure of ninety pounds, attached to top or side of steam chest, as most convenient to suit style of engine; a globe valve placed between safety valve and steam chest, this valve being operated from the cab of engine; a discharge pipe connecting steam chest and main air reservoir, and in discharge pipe is placed a check valve, preferably close to main reservoir.

64. When it is necessary to use the device, *steam being shut off*, the reverse lever is placed slightly back of center notch, and the cylinder cocks left open for three or four revolutions of the engine to allow water that may be in the cylinders to escape; then open the globe valve and place the brake valve in charging position.

The reverse lever must be left back of center notch at least fifteen seconds after full pressure has been indicated on the air gauge.

65. Then before the reverse lever is moved forward place the brake valve on the lap; and, in case the air pump is not working, the globe valve should be closed, as the pistons will draw air from the main reservoir before the check valve will close.

66. By placing the brake valve on the lap, and closing the globe valve before moving the reverse lever forward, sufficient pressure will be retained in the main reservoir to release the brakes.

67. After the air compressor has ceased to work, the brake valve should be left on the lap at least five seconds, so that the air in the train will have time to equalize. If air is used immediately after moving lever ahead, there being a higher pressure in the train pipe than in auxiliary reservoirs, air will be wasted, as the air in train pipe must be reduced to a lower pressure than that in auxiliary reservoirs to set the brakes; but, if time be allowed to let the air equalize, all air that has been forced back may be used to advantage.

68. Steam must never be used through the Sweeney device; and enginemen must use great care to prevent opening of globe valve when working steam, and promptly report any leakage of globe valve.

This device to be used only in case of emergency, or as provided by Rule 61. It must be tested by all enginemen immediately after leaving terminals to ascertain if it is in proper working order, and if not the fact must be reported by wire from the first telegraph office reached.

TRAINMEN.

69. Either the conductor or the rear brakeman will station himself opposite the rear car and note from personal inspection that the brakes are applied by the engineer, as provided in Rule 32.

After making up, setting out cars from or adding cars to the train, or after change of engines between terminal stations, trainmen shall ascertain whether the brakes are connected through the train, and see that the stop cocks in train pipe are all open, except the stop cock on rear of the last car, which should be closed. Car inspectors will make this test at all terminal stations. The rear brakeman will then proceed to apply the brakes by opening the cock at rear end of last car in train gently, allowing only enough air to escape to apply the brakes slowly and firmly, *but without making the emergency application*. Having thus applied the brakes he will close the cock, and if the brakes are at once released it is plain that all cocks between the rear of train and the engine are open. If the brakes do not release promptly, it indicates that there is some obstruction which prevents the air from flowing back through the train pipe. This must be remedied before the train starts. This test must also invariably be made by the rear brakeman at stations, at the summit and foot of all mountain grades (whether any switching is done at such station or not); and in case a train passes over a division without change in its make up, this test must also be made at two or more intermediate stations between terminals, whether on grades or levels, such intermediate stations to be designated by the division superintendent.

The conductor must not give the starting signal at such stations until assured by the rear brakeman that the brakes have been applied and released properly.

70. Brakemen must at each station (and between stations on grades where trains are moving under control of the air brake) listen for the exhaust of air from the brake cylinder when the brakes are released by the engineman, and

if they fail to hear this on any car, an immediate examination should be made of the brakes.

In addition to all other rules and instructions relative to the automatic brake, it is hereby ordered that the rear brakeman at every station on mountain grades, and at each alternate station on other parts of the road shall get out and observe whether or not the brakes apply properly in making the stop and release properly before starting. If he finds the brakes do not apply and release properly, he must immediately report the fact to his conductor, who will take necessary action to remedy the defects.

71. Before starting up or down mountain grades, the trainmen must examine brakes and air apparatus carefully. When it is found necessary to cut out brakes on cars, the engineman should be notified of all cars so cut out.

72. Before descending mountain grades, the handles of retaining-pressure valves must be turned up (see Rule 7) on all cars, except mail and express cars without end doors. Watch the wheels closely to prevent heating or sliding. At foot of grade, the handles of all retaining-pressure valves must be turned down. (See Rule 8.)

On all passenger trains, at all station stops, descending mountain grades, the brakeman will turn down the pressure-retaining valves as soon as station stop is made, leaving them turned down until after brakes are released and train started, when they will again be turned up.

73. Train men will be held responsible for sliding and flattening of wheels.

74. The conductor's valve must be used to stop trains only in case of emergency. By use of the conductor's valve, the brakes are applied suddenly and with full force, causing the wheels to slide, and disarranging adjustment of brakes.

75. The conductor must note on cards provided for the purpose, all defects of air-brakes on his train, and hand the

card to the car inspector at the end of the trip; when no defects to report, note on card, "Brakes O. K."

76. It is the duty of trainmen and yardmen, when detaching air hose between cars, to properly couple hose to the dummy coupling. (See Rule 3.)

77. When passenger trains are cut at a way station, and cars are set out from or added to the trains, and rear brakemen make the test of the automatic brake (as per Rule 69), they will also test the air-signal apparatus in the same manner as car inspectors do at terminal stations. (See Rule 92.)

Conductor must not start train till assured that air-signal apparatus is working properly.

78. In case anything should happen to air-signal valve in a car, the air signal can be cut out of that car by closing the cut-out cock just below signal valve.

79. In giving air signals from train, each exhaust of signal valve must be clear and distinct, and at an interval of from one to two seconds between each exhaust, otherwise the signals will run together.

80. The air-signal hose couplings are painted red, and all concerned should understand that they will not couple with air-brake hose couplings.

81. Hose couplings of air-signal apparatus must be hung up in dummy couplings when not in use.

CAR INSPECTORS.

82. Inspectors must be prompt and regular in the discharge of their duties, and allow no defects in air-brakes to go unheeded.

83. Cylinders and triple valves must be cleaned and oiled once thoroughly every three months.

84. Packing should be examined carefully each time cylinder is oiled. If the leather is found broken or worn thin, it should be removed and replaced with a new one. Where leather is found in good order, or only slightly worn, give the piston a half turn (bottom side up), so as to allow an equal wear on both sides of packing.

85. In oiling triple valves use mixture of one part of headlight oil and one part of lard oil. For cylinders, use car oil; clean all parts thoroughly, and note that all passages are open and clear of dirt. See that leakage groove in cylinder is clear of dirt before replacing piston. Before replacing cylinder head, move piston back and forth full stroke to insure that it works freely.

86. Note with indelible pencil, in proper place on cylinder, date of cleaning and oiling.

87. Water of condensation must be drained from auxiliary reservoirs and triple valves frequently, especially in cold weather.

88. Inspectors must see that all passenger air-brake cars are supplied with dummy couplings, properly located as not to kink hose when coupled to it. Dummy couplings must be secured to cars rigidly, and not attached to chains.

89. It is the duty of the car inspectors to receive defect cards from conductor at end of trip, repair defects, sign card and return to division superintendent.

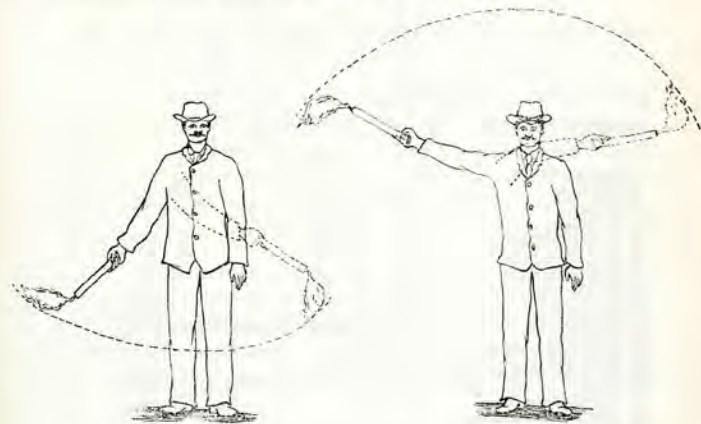
90. Inspectors must not allow trains to depart from terminal points until brakes are applied from the engine, and they have satisfied themselves that all brakes in the

train are in good order; then report to engineman regarding condition and number of brakes in train. (See Rule 32.)

Car inspectors will make the test from rear of train at all terminal stations as provided in Rule 70.

91. Car inspectors at terminal stations will give the same attention to the air signal apparatus, as they do to the automatic brakes, as per Rule 69.

They will see that the pipes and hose are tight, and that signal valves in each car are in good working order.

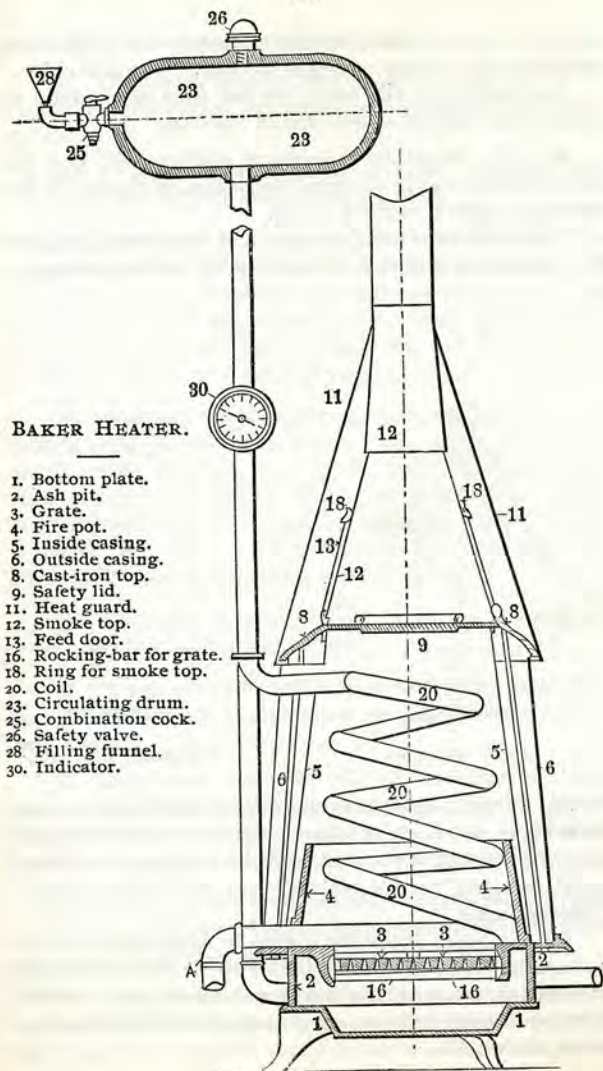


APPLY BRAKES.

RELEASE BRAKES.

92. A white light, or torch, will be used by car inspectors at night, as shown in above diagrams, to signal enginemen when testing air-brakes on freight trains; the "stop" signal meaning "apply brakes," and the overhead signal "release brakes."

On passenger trains the signal to *apply* brakes will be the same as on freight trains; the signal for *releasing* brakes on passenger trains will be two short blasts of the air whistle given by inspectors from rear of train, which will also serve to test the whistle.



BAKER HEATER.

1. Bottom plate.
2. Ash pit.
3. Grate.
4. Fire pot.
5. Inside casing.
6. Outside casing.
8. Cast-iron top.
9. Safety lid.
11. Heat guard.
12. Smoke top.
13. Feed door.
16. Rocking-bar for grate.
18. Ring for smoke top.
20. Coil.
23. Circulating drum.
25. Combination cock.
26. Safety valve.
28. Filling funnel.
30. Indicator.

BAKER HEATERS.

To insure satisfactory results in the use of the heater, the following instructions must be strictly observed:

1. The heater should be kept half full of coal at all times. The coal should never be allowed to get below top of worm. This will give about fifteen inches of fire.

2. The inside safety lid should never be opened except to build the fire or to put in coal. (Never force the fire by opening inside safety lid.)

3. To increase the heat open inside lower damper, and close upper damper.

4. To reduce the heat close the lower damper and open the upper damper about two inches, or according to the amount of heat required. With both dampers closed, the car will not be too warm at any time, and, by proper working of the lower and upper dampers, and watching the indicator, the car can be kept at any temperature desired.

5. Failure of the heater arises from neglect or mismanagement, generally from allowing fire to run too long without putting in coal, then filling them full and opening drafts, producing a rapid fire, which, instead of warming the car, stops the circulation and creates gases, which are liable to explode.

6. It will be readily understood that, with the large amount of piping in the cars, the circulation (which is principally caused by the weight of the column of water falling from the drum into the pipes and the difference in weight of a column of cold and hot water) must be necessarily slow, and that a forced fire will do no good, but will only cause the effect mentioned above.

7. In filling the heater pipes, be sure that the water contains all the salt it will hold in solution, and that no undissolved salt enters the drum (except in case of Pullman sleeping cars, in which no salt should be used). Open the combination cock on end of drum, on top of car, and pour

in water until it runs freely from same. The water should always stand at height of combination cock, which may be tried by opening the cock, but only when the fire is very low and no pressure on. Pipes should be warm all round before passengers enter the car. It takes from three to four hours to get up a good circulation.

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