367. **Form E.—Time orders:**

(1) ..... will run ..... late ..... to .....
(2) ..... will run ..... late ..... to ..... and ..... late ..... to ....., etc.
(3) ..... will wait at ..... until ..... for .....

Examples.

(1) *No. One 1 Eng. 67, Palmer, will run twenty 20 mins. late, Joppa to Mainz.*

(2) *No. One 1 Eng. 67, Palmer, will run twenty 20 mins. late, Joppa to Mainz, and fifteen 15 mins. late, Mainz to Muscat, etc.*

(3) *No. One 1 Eng. 67, Palmer, will wait at Muscat until Ten 10 a. m. for No. Two 2 Eng. 89, Willits.*

368. (1) and (2) make the schedule time of the train named, between the points mentioned, as much later as stated in the order, and any other train receiving the order is required to run with respect to this later time as before required to run with respect to the regular schedule time. The time in order should be such as can be easily added to the schedule time.

Under (3) the train first named must not pass the designated point before the time given unless the other train has arrived. The train last named is required to run with respect to the time specified as before required to run with respect to the regular schedule time of the train first named.

369. **Form F.—For sections:**

(1) ..... will display signals ..... to ..... for .....

Examples.

Eng. 20, Smith, will display signals and run as First No. One 1 London to Paris.

No. One 1 Eng. 67, Palmer, will display signals London to Dover for Eng. 85, King.

Second No. One 1 Eng. 105, King, will display signals London to Dover for Eng. 90, Roberts.

370. This form may be modified as follows:

Engs. 70, Creighton, 85, King, and 90, Knox, will run London to Dover as First, Second, and Third No. One 1 respectively.

Under these examples, the engine last named will not display signals.

371. **To annul a section** for which signals have been displayed over a division or any part thereof when no train is to follow the signals, Form K must be used.

372. **Form G.—Extra trains:**

(1) Eng. ..... will run extra ..... to ..... .
(2) Eng. ..... will run extra ..... to ..... and return to ..... .

Examples.

(1) *Eng. 99, Jones, will run extra Berber to Gaza.*

(2) *Eng. 99, Jones, will run extra Berber to Gaza and return to Cabul.*

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

(3) Eng. ..... will run extra leaving ..... on ....., as follows, with right over all trains:

Leave ..... .
Leave ..... .
Arrive ..... .

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

Example.

(3) *Eng. 77, Wilson, will run extra leaving Turin on Thursday, February 17, as follows, with right over all trains:*

Leave Turin Eleven thirty 11.30 p. m.
Leave Pekin Twelve twenty-five 12.25 a. m.
Leave Canton One forty-seven 1.47 a. m.
Arrive Rome Two twenty-two 2.22 a. m.

This order may be varied by specifying the kind of extra and the particular trains over which the extra shall not have the right. Trains over which the extra is given the right must clear the time of the extra 10 minutes. The train dispatcher may increase the clearance time at his discretion.

373. **Form H.—Work extra:**

(1) Work extra.....will work.....until.....between.....and.....

Examples.

(1) *Work Extra 292, Smith, will work Seven 7 a. m. until Six 6 p. m. between Berne and Turin.*

374. 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:

(*a*) *Work Extra 292, Smith, will run Berne to Turin and work Seven 7 a. m. until Six 6 p. m. between Turin and Rome.*

When an order has been issued to "work" between designated points, no other extra shall be authorized to run over that part of the track without a definite meeting order with the work extra.

When it is anticipated that a work extra may be where it can not be reached for orders, it will be directed to report for orders at a given time and place, and a meeting order issued with other extra.

375. To enable a work extra to work upon the time of a regular train, the following form may be used:

(*b*) *No. Fifty-five 55 Eng. 342, Jones, will wait at Berne until Six 6 p. m., for Work Extra 292, King.*

A work extra receiving this order will work upon the time of the train mentioned in the order as per par. 279.

A train receiving this order must not pass the designated point before the time given unless the work extra has arrived.

376. **Form J.—Holding order:**

(1) Hold.....

Examples.

(1) *Hold No. Two 2 Eng. 481, Palmer.*
(2) Hold all eastbound trains.

This order will be addressed to the operator, and acknowledged in the usual manner. It must be respected by conductors and enginemen of trains thereby directed to be held as if addressed to them.

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

"*.....may go.*"

Form J will only be used when necessary to hold trains until orders can be given, or in case of emergency.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

378. **Form K.—Annulling a regular train; or section:**

(1) .....of.....is annulled.....to.....
(2) .....due to leave..... ....., is annulled.....to.....

Examples.

(1) *No. One 1 Eng. 392, Smith, of Feb. 29, is annulled Alaska to Halifax.*
(2) *No. Three 3 Eng. 768, Wilson, due to leave Naples Saturday, Feb. 29, is annulled Alaska to Halifax.*

The train annulled loses both right and class between the points named, and must not be restored under its original number between those points.

379. **Form L.—Annulling an order:**

(1) Order No..... is annulled.
(2) Order No.....to.....at....is annulled.

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.....

Examples.

(1) *Order No. Ten 10 is annulled.*
(2) *Order No. Ten 10 to C. & E. No. Two 2, at Alaska, is annulled.*

An order that has been annulled must not be reissued under its original number.

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

381. **Form M.—Annulling part of an order:**

(1) That part of Order No. ..... reading ..... is annulled.

Example.

That part of Order No. Ten 10 reading No. One 1 Eng. 67, Palmer, will meet No. Two 2 Eng. 58, King, at Sparta is annulled.

In the address of an order annulling a part of an order, the train first named must be that to which right was given by the part annulled, and when the order is not transmitted simultaneously to all concerned, it must be first sent to the point at which that train is to receive it, and the required response received, before the order is sent for other trains.

382. **Form P.—Suspending an order or a part of an order:** This order will be given by adding to prescribed forms the words "instead of ....."

(1) ..... will meet ..... at ..... instead of .....
(2) ..... has right over .... to ..... instead of .....
(3) ..... will display signals for .... to ..... instead of .....

Examples.

(1) *No. One 1 Eng. 765, King, will meet No. Two 2 Eng. 642, Palmer, at Hongkong instead of Bombay.*
(2) *No. One 1 Eng. 765, King, has right over No. Two 2 Eng. 642, Palmer, Mecca to Medina instead of Mirbat.*
(3) *No. One 1 Eng. 765, King, will display signals for Eng. 85, Smith, Astrakhan to Teheran instead of Cabul.*

An order that has been suspended must not be reissued under its original number.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

In the address of a superseding order, the train first named must be that to which right was given by the order superseded, and when the order is not transmitted simultaneously to all concerned, it must be **first sent** to the point at which that train is to receive it, and the required response received, before the order is sent for other trains.

383. **Release:**

(*a*) From Train Order Signal, but not from Block, unless stamped "BLOCK IS CLEAR:"

....., 19..

C. & E., No. .....
My train-order signal is displayed for .....
I have no orders for .....
Last train ahead left at .....

....., Signalman.

Or, signalmen will fill out the following release:

(*b*) From train order *and* block signal:

Signal is displayed for ..... and ..... to meet or pass at .....
Except as above block is clear.
Issued at ..... m.
Last train ahead left at ..... m.

....., Signalman.

NOTE.—When a block signal is at diagonal it only indicates that block is clear to the first switch reached at the next block station.

Should any train have orders not to pass a station *without orders*, the receipt of this blank does not release it, but in such cases regular train orders must be obtained.

384. **Caution card:**

To C. & E., Train .....
Block is not clear. You may proceed with caution, prepared to stop within your vision.

....., Signalman.

385. **Clearance:**

....., 19

C. & E., No. .....
No orders have been received at ..... station for train No. ....., due at said station at ..... m., ..., 19
Last train ahead left at ..... m.

....., Operator.

NOTE.—Should any train have orders not to pass any station *without orders*, the reception of this blank does not release it, but in such cases regular orders must be obtained.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

386. Standard train-order blank for "31" order:

Form 31. Form 31.

UNITED STATES MILITARY RAILWAY.

TRAIN ORDER NO. *10.*

March 27, 1906.

To *C. & E., No. 2.* At *Joppa.*

To .....

X *J. D. B* Opr. *1.45 a.* m.

Train ahead left at *12.30 a.* m.

No. One 1 Eng. 765, King, has right over No. Two 2 Eng. 642, Palmer, Mecca to Medina instead of Mirbat.

"12" P. G. C.

Conductor and engineman must both have a copy of this order.

Repeated at *2.20 a.* m.

CONDUCTOR.	TRAIN.	MADE.	TIME.	OPR.
Palmer	*2*	*Complete*	*2.20 a.* m.	*Black*

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

387. **Standard train-order blank for "19" order:**

Form 19.	Form 19.
UNITED STATES MILITARY RAILWAY.	
TRAIN ORDER NO. *10.*	
March 27, 1906.	
To *C. & E., No. 1.* At *Teheran.*	
X ....., Opr. *1.45 a.* m.	
No. One 1 Eng. 765, King, will meet No. Two 2 Eng. 85, Smith, at Astrakhan instead of Cabul. *"12" P. G. C.*	
Conductor and engineman must both have a copy of this order.	
Made *complete* time *1.50 a.* m. *Black*, Opr.	

CONTROL OF TRAINS BY BLOCK SIGNALS.

388. The telegraphic train-dispatching system is so dependent upon the dispatcher and so many accidents occur through negligence or incompetence, that a system of control known as the block system is used on all first-class roads. For this system each division is divided into blocks, i. e., into lengths of track of defined limits the use of which by trains is controlled by block signals.

389. A **block signal** is usually a semaphore or a disk, placed on a pole so as to be conspicuous to trains whose movements are governed by it. The **normal position** of all block signals is at **danger** or **stop.**

390. A **home block signal** is a fixed signal at the entrance of a block, to control trains in entering and using said block.

391. A **distant signal** is a fixed signal, used in connection with a home signal to indicate that the home signal may be at "stop" when the distant signal is at "caution," or that the home signal is clear when the distant signal is clear.

392. An **advance block signal** is a fixed signal, used in connection with a home block signal to subdivide the block in advance.

393. A **block station** is an open station where there is a block signal.

An **intermediate siding**, as used in block-signal rules, is a siding between block stations, or a siding where the block station is closed.

394. The **telegraph block system**, or **manual block system**, is the one that would lend itself most readily to military use. The other systems require apparatus that would undoubtedly be destroyed on a road captured from the enemy, and that could easily be disarranged by a few active spies, or partisans, who knew enough about the system to know how to disable it most seriously.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

The block stations will either be connected by telegraph or telephone, and one wire on each division must be allotted for the use of this block system. At all block stations at least a home signal, and if practicable both a home and distant signal, will be erected, bearing lights and arms as shown in figs. 133, 134.

It has been found that about 5 miles is the length of block that gives the best results for this system.

395. The movement of trains is regulated by block signals between limits designated by the time-table or by special instructions.

396. Block signals control the use of the blocks but, unless otherwise provided, do not affect the movements of trains under the time-table or train rules nor dispense with the use or observance of other signals whenever or wherever they may be required.

397. Where the semaphore is used, the governing arm is displayed to the right of the signal mast, as seen from the approaching train, and the indications are given by position; the arm in a horizontal position, and in addition at night a red light, when the block is not clear or there are train orders, will indicate **stop,** and will be referred to as a **stop signal.** The arm inclined downward, and in addition at night a green light, when the block is clear or there are no train orders, will indicate **proceed,** the block is clear to the first switch reached at the next block station, and will be referred to as **clear signal.**

398. Block signals are to be used to control movements of trains upon main track, and must *not* be accepted by trains on sidetracks.

399. **Proper authority** must be obtained from signalmen before proceeding, by trains arriving at a block station where signal is at "stop," by trains occupying sidetracks, or by trains starting from terminal stations.

"Proper authority" consists of:

(*a*) A caution card and a release.
(*b*) A release stamped "Block is clear."
(*c*) Train order stamped "Block is clear."
(*d*) Train orders and a caution card.

Trains will be governed as per instructions on caution card par. 384. This does not relieve the preceding train from compliance with par. 322.

400. Upon the arrival of a train the signalman will first execute any train orders or block orders he may have, then ascertain from his block register if block is clear, but will not clear his signal until all orders concerning such trains are satisfied and block in advance is clear, and he has received the "13" response, as per code, from next block station in advance.

401. In moving trains in established direction the signalman will, on approach of a train, ascertain from his block register if block is clear, and will not clear his signal until all orders concerning such train are satisfied and block in advance is unoccupied.

402. When there are no train orders and the block ahead is clear for an approaching train, the signal will be changed to "clear" so that the train may enter without reducing speed; and when the train has passed the block signal and the signalman has seen the markers, he must display the stop signal; and when the rear of the train has passed 300 ft. beyond the block signal, he must give train number and the time to the next block station in the rear.

403. Should a train pass a block station in **two or more parts,** the signalman must notify the signalman at the next block station in advance. A signalman having received this notice must stop any train running in the opposite direction. The stop signal must not be displayed to the engineman of the divided train if the block in advance is clear, but the **train-parted** signal must be given. Should a train going in the opposite direction be stopped, it may be permitted to proceed when it is known that its track is not obstructed.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

404. A **caution card** is used when trains are permitted to enter a block under notice that such block is not clear. This may be used as follows:

First.—By direction of the train dispatcher, in which event he will send an order of the following form:

"Signalman at ....., issue caution card No. ....., to ....., O. K. ....."

Dispatchers must not authorize operators to issue caution card to any train or engine to enter a block occupied by a passenger train except in case of accident.

Second.—If from the failure of telegraph line or other cause a signalman be unable to communicate with the next block station in advance, he must stop every train approaching in that direction. Should no cause for detaining the train be known, it may then be permitted to proceed, provided 10 minutes have elapsed since the passage of the last preceding train, using caution card, par. 384.

When a train is allowed to enter a block under caution card because communication with the signalman in advance can not be had, positive orders will be given by notation on the caution card, directing train and enginemen to stop at next station and ascertain the trouble.

405. Should a portion of a train **run back** in the wrong direction, the signalman must notify the next block station toward which the portion of the train is running. The signalman receiving this notice must stop any train running on the same track in the opposite direction, and take such other protective measures as may be practicable.

406. A signalman informed of **any obstruction in a block** must display the stop signal and notify the signalman at the other end of that block. The signalman at the other end of that block must immediately display the stop signal. The clear signal for that block must not be displayed until the obstruction is removed.

AUTOMATIC BLOCK SYSTEM.

407. **Explanation of signals.**—The signals used are either the **semaphore** or the **inclosed disk.**

The signal indications are given by not more than two positions of an arm or a disk, and, in addition, at night by lights of prescribed color.

The apparatus is so constructed that the failure of any part directly controlling a signal will cause it to give the normal indication, i. e., danger.

408. The signals, if practicable, are either over or upon the right of and adjoining the track to which they refer. On double track the high signals will be located on the left of and adjoining the track to which they refer. For less than three tracks, the signals for trains in each direction may be attached to the same signal mast.

409. When main running tracks are operated in the same established direction and the space between tracks will not permit of signal masts being located adjoining the track to which they refer, the masts will be located either on a signal bridge or a bracket post.

410. On a bracket post signals on the right-hand mast refer to the main running track farthest to the right; the signals on the next mast to the left refer to the main running track to the left of the first-mentioned track, and so on for each main running track operated in the same established direction.

411. Semaphore arms that govern are displayed to the right of the signal mast as seen from an approaching train.

412. Switches in the main track are so connected with the block signals that the home block signal in the direction of approaching trains will indicate **stop** when the switch is not set for the main track.

413. Distant block signals are connected with the corresponding home block signals and so constructed that a train between the distant and home signals, or a switch not set for the main track within the same limits, or the failure of any part controlling the signal, shall cause it to indicate **caution.**

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

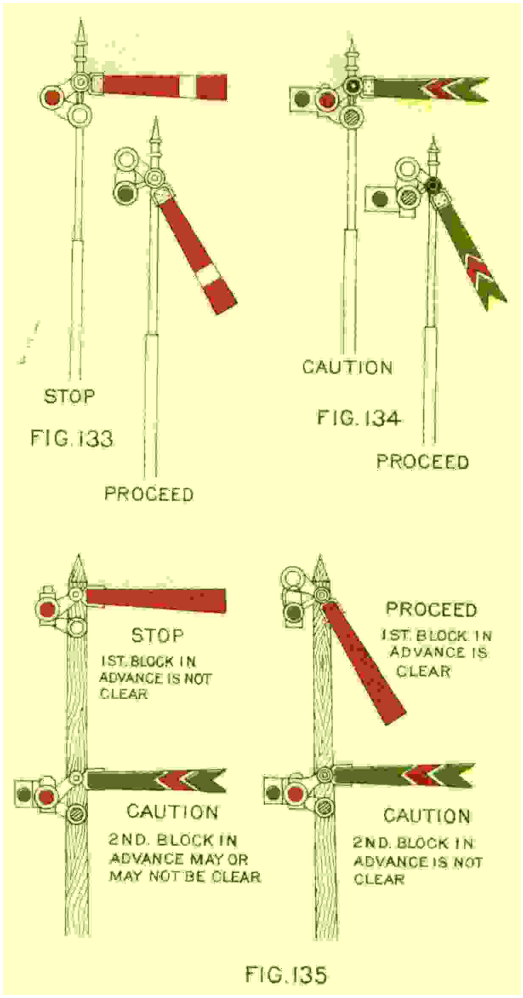

FIG. 133

FIG. 134

FIG. 135

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

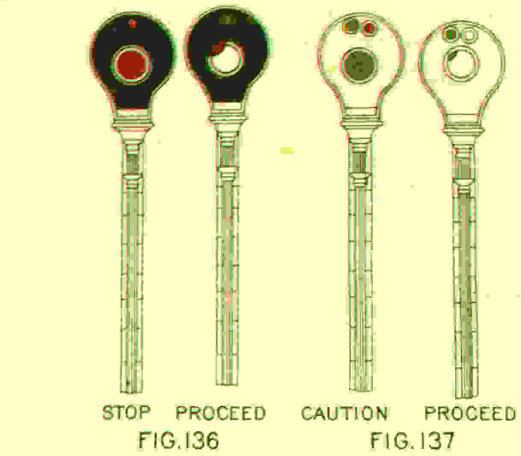

FIG. 136

FIG. 137

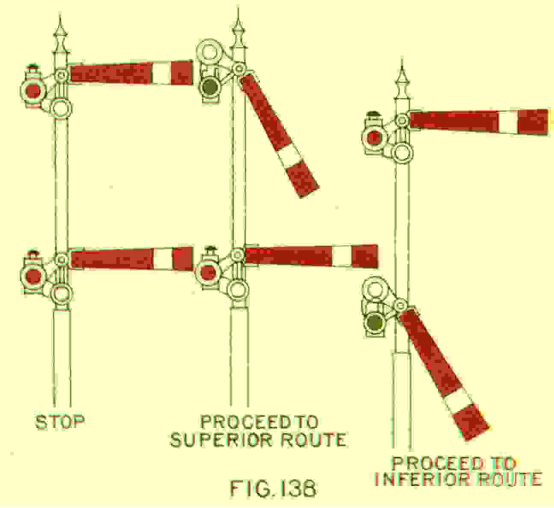

FIG. 138

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

414. Where indicators are placed at the main-track switches, the indicator disk will be visible (through the front opening of the case) when the head of an approaching train has reached a point not less than 1,000 ft. in advance of the block signal protecting the switch.

415. The indications for the main running track are given by a high home signal.

416. Automatic block signals are numbered to indicate the established direction of the running track for which the signal is given, and lettered to denote the district in which they are located.

417. Even-numbered signals govern train movements upon the southbound or eastbound track, and odd-numbered signals upon the northbound or westbound track.

418. Where the semaphore is used, the governing arm is displayed to the right of the signal mast as seen from an approaching train, and the indications are given by two positions of the arm, and, in addition, at night by lights of prescribed color.

419. Where a single disk is used, the two indications are given by the position of a red or green disk, and, in addition, at night by lights of prescribed color.

420. A **home semaphore signal** (see fig. 133) will display an arm in the horizontal position, and in addition at night a red light, when the block is not clear. This will indicate **stop**, and will be referred to as a **stop signal.** Or, it will display an arm inclined diagonally downward from the horizontal, and in addition at night a **green** light, when the block is clear. This will indicate **proceed**, and will be referred to as a **clear signal.**

Where two signals are displayed from the same mast, the upper one is the home block signal for the block in advance, and the lower one the distant signal for the second block in advance (see fig. 135).

421. A **distant semaphore signal** (see fig. 134) will display a forked arm in a horizontal position, and in addition at night a **red and green** light, when the home signal with which it is used is at **stop** or the track obstructed between home and distant signal. This will indicate **proceed with caution to the home signal**, and will be referred to as a **caution signal**; or, it will display a forked arm inclined diagonally downward from the horizontal, and in addition at night a **green** light, when the home signal with which it is used is at "clear" and the track unobstructed between home and distant signal. This will indicate **proceed**, and will be referred to as a **clear signal.**

422. A **home disk signal** (see fig. 136) will display a red disk, and, in addition, at night a **red** light, when the block is not clear. This will indicate **stop**, and will be referred to as a **stop signal**; or, the red disk will be withdrawn from view and, in addition, at night a **green** light will be displayed, when the block is clear. This will indicate **proceed**, and will be referred to as a **clear signal.** The face of a home signal case is painted black and the back yellow.

423. A **distant disk signal** (see fig. 137) will display a **green** disk with a **white cross** on its face, and in addition at night a **red and green** light, when the home signal with which it is used is at **stop** or the track obstructed between home and distant signal. This will indicate **proceed with caution to the home signal, and will be referred to as a caution signal.**

Or, the disk will be withdrawn from view, and, in addition, at night a **green** light will be displayed, when the home signal with which it is used is "clear" and the track unobstructed between the distant signal and the home signal. This will indicate **proceed**, and will be referred to as a **clear signal.**

The face of a distant signal case is painted white and the back yellow.

424. Block signals control the use of blocks, but, unless otherwise provided, do not affect the movements of trains under the time-table or train rules, nor dispense with the use or the observance of other signals whenever and wherever they may be required.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

425. Block signals apply only to trains running in the **established direction.**

426. When a train is stopped by a block signal, it may proceed when the signal is cleared, or after waiting one minute and then running under caution to the next clear signal.

427. When a signal is out of service, the fact will be indicated by a white rectangular shield hung over the number. Trains finding a signal out of service must, unless otherwise directed, proceed with caution to the next signal.

428. When a train is stopped by a signal which is evidently **out of order,** and not so indicated, the fact must be reported to the division superintendent.

429. A signal **imperfectly displayed,** or the absence of one at a place where a signal is usually shown, must be regarded as a danger signal and the fact reported to the division superintendent.

430. **The home signal will indicate " stop "** when the block is occupied, when a switch is set for a siding or a crossover, when a car on a siding fouls the main-line track, when the track circuit is broken, or when the signal is out of order.

431. The **crossover switches** between the main running tracks are so connected with the block signals that the home block signals in the direction of approaching trains will indicate **stop** when either switch of the crossover is not set for the main running track.

432. A switch must not be opened to permit a train movement to the main track when the red disk is visible in the indicator box at that switch.

433. A switch may be opened to permit a train movement from the main track when the red disk is visible in the indicator box at that switch.

INTERLOCKING PLANTS.

434. A **high signal** is a signal supported on a mast at a height of at least 20 ft. above the track; it may be a home signal or a distant signal.

A **mast** is an upright to which the signals are directly attached.

A **home signal** is a fixed signal at the point at which trains are required to stop when the route is not clear.

A **distant signal** means the same as the block-signal term.

Dwarf signal. A low home signal.

435. The following are the general principles on which interlocking signals are located and applied:

The **signal** used is the semaphore.

The **indications** are given by not more than two positions of an arm, and in addition at night by lights of prescribed color.

The apparatus is so constructed that the failure of any part directly controlling a signal will cause it to give the normal indication.

436. The signals, if practicable, are either over or upon the right of and adjoining the track to which they refer. On double track the high signals will be located on the left of and adjoining the track to which they refer.

437. The normal indication of a home signal is **stop,** and of a distant signal is **caution.**

The semaphore arms that govern are displayed to the right of the signal mast, as seen from an approaching train.

The apparatus is so constructed that the failure of any part directly controlling a switch or lock will prevent the display of the clear signal.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

438. **When main running tracks are operated** in the same established direction and the space between tracks will not permit of the signal masts being located adjoining the track to which they refer, the masts will be located either on a signal bridge or bracket post.

On a bracket post, signals on the right-hand mast refer to the main running track farthest to the right; the signals on the next mast to the left refer to the main running track to the left of the first-mentioned track, and so on for each main running track operated in the same established direction.

439. When the train service on one main running track is superior to that on another, the signals for that track will be placed 6½ ft. higher on its mast than those for the track of inferior service.

440. The indication for a main running-track movement in the established direction will be given by a high home signal (see fig. 133).

441. **The indication for a main running-track movement** in the established diverging direction at a junction will be given by one of two signals, located one above the other on the same mast; the topmost signal will govern the superior route and the lower signal that of the secondary or inferior route (fig. 138).

442. The indication for a diverging movement from the main running track in the established direction to a secondary or side track will be given by a dwarf signal located on the right of and adjoining the track to which it refers and either at the foot of or opposite the high home signal. The light on the dwarf signal corresponding to the stop indication will be shielded off, the high home signal giving the **stop** indication, and the dwarf signal the **proceed** indication for the diverging movement.

443. The indication for **reverse movement** from the established direction on or from a main running track, or for a movement on a side track in either direction, or from a sidetrack to the main running track, will be given by a dwarf signal.

444. The semaphore arms that govern are displayed to the right of the signal mast as seen from an approaching train.

445. **Interlocking signals,** unless otherwise provided, do not affect the movements of trains under the time-table or train rules, nor dispense with the use or the observance of other signals whenever and wherever they may be required.

446. **Trains.**—The number of regular passenger trains to be run daily will be specially determined in each case, and will not provide for larger troop movements than parts of companies. Where one company or more is to be moved, extra cars will be added to the regular passenger train, or extra trains will be run. These extra trains can, by train orders of the train dispatcher or his superior, be given any rights on the road that are necessary. **Quick dispatch** is freight that must be rushed through without delay in the fastest time practicable. Speed is essential.

447. **Time freight** is freight that must be delivered within a certain time, and must be forwarded without delay. Regularity of movement is essential.

448. **Dead freight** is freight that need not be hurried and that delay can not harm. Military conditions will sometimes change the classification from dead freight to time freight. A hurried shipment of ammunition illustrates the case in point.

449. **Local freight** is freight shipped from one point on a division to another point on the same division, or to a point on an adjacent division. On a military road, the number of regular time freights, or other freights, will depend entirely upon the local conditions. On any division at least one local freight will be run each way daily. These locals deliver freight from the division terminals to various points along the division, distribute empties where they may be required, and pick up loads at the intermediate stations and carry such loads to the other division terminal, where they are either placed in through trains for their ultimate destination or are forwarded on another local if their destination is on the next division.

Time freights may stop at intermediate stations to pick up an important car, or such a car may be forwarded by a local freight train to the nearest large station, or division terminal, before it is placed in a through freight train.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

450. When a shipment of through freight **requiring an extra train** is received on a division, the train dispatcher of that division promptly notifies the **train dispatcher of the next division** of the number of cars of such shipment, together with the class and probable time of arriving on the next division. This permits the next train dispatcher to arrange his power and train crews to take care of such extra shipment.

451. **Number of trains daily.**—The only general statement that can be made in regard to the capacity of a line is the number of trains that can be run over a line in 24 hours. Mr. M. Kirkman, of the C. & N. W. Ry., cites a case where, for a period of two weeks, a single-track line handled 25 trains per day, 4 passenger and 21 freight, in each direction. This is probably a maximum for single track, and will be attainable only under the most favorable conditions and the most efficient operation.

On double-track line the distance apart of trains is only dependent upon considerations of safety and ability to handle the trains at the terminals.

452. **The ordinary accumulation** of cars that collect at division terminals are arranged into the regular trains by the yardmaster, who notifies the roundhouse foreman of the locomotive needed, and the train crew to run the train. When the total accumulation of cars can not be run in the regular trains, he notifies the chief dispatcher, who orders out extras enough to move the cars. As soon as a train is made up and ready to move, the conductor of the train makes up a **consist, or detail sheet**, showing the composition of his train. This sheet shows the date, train number, time of leaving, number of locomotive, names of engineer and conductor, and gives the contents and destination of each load, and will state when carded, or specify time freight. **For time freight**, they will give the junction point through which it is routed. **For empties** in their train, they give the initials, destination, size and kind of each car. This consist is telegraphed to the chief dispatcher, who thus knows the contents of each train. He has at hand the local car sheet, described in par. 234, and thus can arrange to **keep the train full**, distributing empties where needed and picking up loads at intermediate stations on the line, and he issues telegraphic orders to accomplish this result. In case the train is late, the consist enables him to order certain cars of unimportant freight set out to lighten the train and thus increase the speed.

453. If all the cars in the train are loaded to their full capacity the weights will be given in the consist; otherwise, the chief dispatcher estimates the weight of the train from a list that he keeps showing the approximate weight of the different kinds of empties and of the same cars normally loaded, and from which he can form a correct estimate of the tonnage in each train. The chief dispatcher must endeavor to keep each locomotive loaded to its **tonnage rating** over each section of the division. Standing instructions should be issued that when trains are not filled to the tonnage rating of the engine this opportunity will be taken to deliver coal along the line.

454. Agents will report daily the amount of **coal on hand**, so as to give timely notice for a new shipment.

TIME-TABLES.

455. After the military controlling staff has decided on the number of trains that must be run for military purposes, the places at which such trains must stop to fulfill requirements, and the amount of civil traffic that will be permitted, they turn this data over to the railway officials to work up into a time-table.

The conditions laid down have determined the number of regular trains of the various classes that must be run, and the time of starting from the initial station will be fixed so as best to meet the military requirements.

The speed of the trains will depend upon the condition of the roadbed, the maximum grade, power of the engine, loads to be hauled, etc., as laid down in pars. 175, 176.

456. A time-table is first made out in **graphic form** (see fig. 139). A rectangle is laid out, and is divided by perpendicular parallel lines into equal divisions representing the 24 hours of the day, subdivided into 5-minute intervals. It is divided by horizontal parallel lines whose distances apart represent the distances between

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

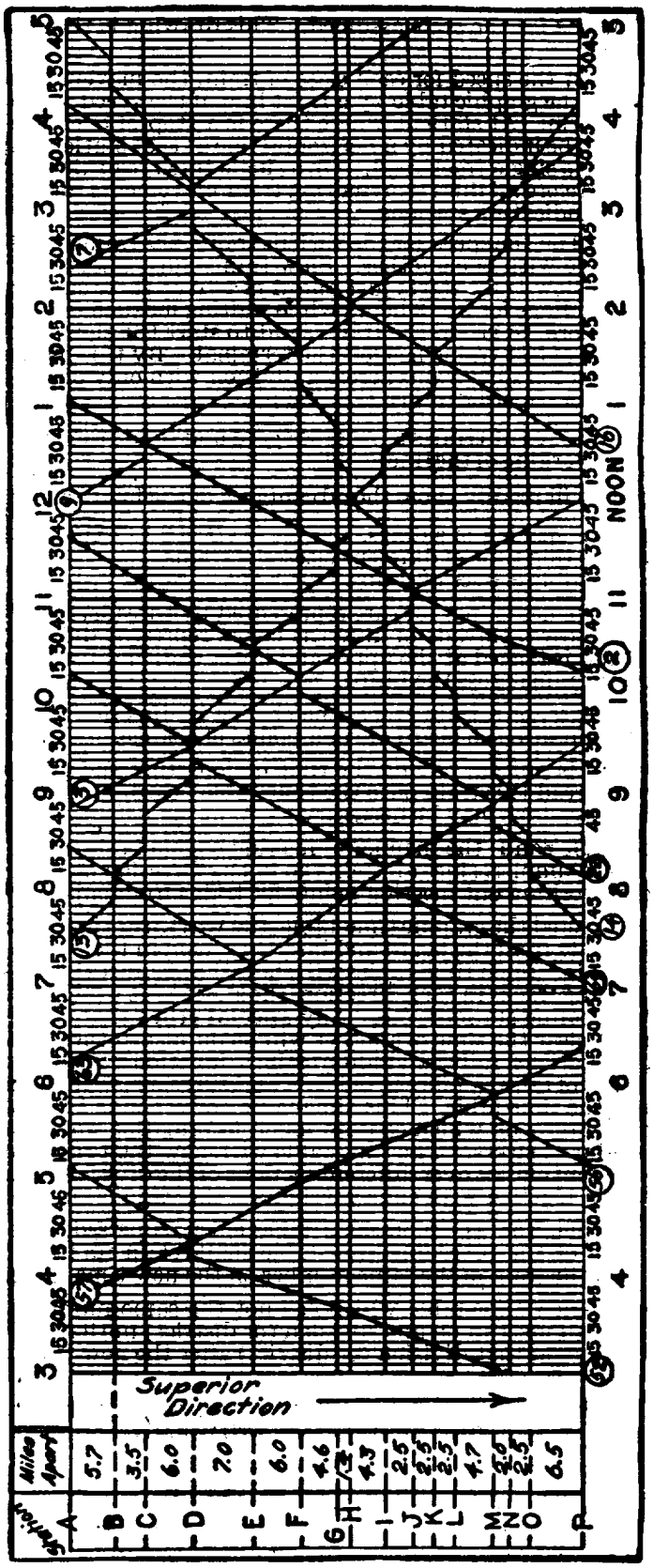

FIG. 139.—PART OF GRAPHIC TIME-TABLE.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

corresponding stations for the scale assumed. This drawing is then fastened to a large drawing board.

Having determined the speed for each class of train, the movement of the train can be indicated on the graphic table by a right line, if the speed between stops is assumed to be uniform. At stations where there is a stop of over 2 minutes, the train movement will be indicated by a horizontal line at that station. Fig. 139 is a type of time-table for a single-track road. On a single-track road all trains meet and pass at stations, therefore all lines representing train movements must intersect on the horizontal lines indicating stations.

Having determined on the speed for the various trains, the trains will be arranged so as to least interfere with one another. Slow trains must take the sidetrack for fast trains; and if a slow train starts just ahead of two or three superior trains, it may be laid out on sidings for 2 or 3 hours while waiting for such fast trains to pass it. It is wise, therefore, to group the trains, and to start the slow trains immediately after the group of fast trains has left the terminal. By this means it is often possible to get the fleet of slow trains across a division with only one or two delays on account of stops for superior trains.

457. **The fewer classes of trains** as regards speed and rights the better and more efficient will be the working of the line.

A rough diagram will readily show the advantages of the following points:

(*a*) The equal time spacing of sidings.
(*b*) The proper starting time of different classes of trains.
(*c*) The fewest possible classes of trains.

458. The train movements (fig. 139) are represented by threads, and, for the sake of clearness on the board, threads of different colors represent different classes of trains. Each thread is tagged at the upper and lower end, and by this means it is easy to follow every train across the board.

Where speed changes, or a train stops, the change in direction of the thread is made by driving a pin into the board at such points of change.

When a new train is put on, having the time of departure and the speed of the train, it is easy to thread this train onto the time-table board, making such corrections in the other threads as may be necessary.

On a **double-track road** the manner of making a time-table is similar to that just described, but is simpler, since all trains go in one direction on each track, and there is no need of working out meeting points for trains from opposite directions.

459. Having completed the graphic time-table, the **working time-table** is made up by taking the times from the board and inserting them in their proper places in the printed time-table. Such time-tables will show the distances between stations, the capacity of passing tracks in each direction, the stations at which all trains stop, watering stations, coaling stations, etc. Any **special rules** that change the time that one train must clear the time of another will be published therein, as will also a list of registering stations, railway grade crossings, junction points, and overhead obstructions. A list of railway officers, officials, and surgeons, with their addresses, will be printed on the time-table. This time-table corresponds to the employees' time-tables of civil railroads which contain much information not found in time-tables for the use of passengers. The time-table will show the **tonnage rating** of locomotives of different classes over different sections of the division for fast freights and for slow freights, together with empty weights of the various kinds of cars used.

460. Each time-table, from the moment it takes effect, supersedes the preceding time-table. A train of the preceding time-table shall retain its train orders and take the schedule of the train of the same number on the new time-table.

461. A train of the new time-table which has not the same number on the preceding time-table shall not run on any division (or district) until it is due to start from its initial station on that division (or district) after the new time-table takes effect.

462. The explanation in the time-table will state the direction that is **superior** on different parts of the line. Trains to the front will usually be superior to those going to the rear.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved

463. The trains of the time-table will be arranged in classes. Trains of the **first class** are superior to those of the second, trains of the **second class** to those of the third, and so on.

464. **Extra trains** are inferior to regular trains. All trains in the **superior direction,** as specified in the time-table, are superior to trains of the same class in the opposite direction.

465. **Regular trains** 12 hours behind their schedule lose both right and class, and can thereafter proceed only on train orders.

466. The time-table will give special instructions regarding the sidetrack to be taken, and any special rules that may be necessary to facilitate movement over the division for which the time-table is issued.

467. A list of **registering stations** will be indicated in the time-table, at which stations conductors of passenger and freight trains will register.

468. When one time is given in the time-table, unless otherwise specified, it is the leaving time. When two are given, they are the arriving and leaving times. **Schedule meeting or passing stations** have the time indicated in full-faced type. When more than one train is to be met at a station, a small number between the time of leaving and arriving indicates the number of trains to be met.

469. The time-tables will indicate by reference marks the points where trains stop, meals are taken, and any other information necessary to clearly explain the time-table. They will also indicate the length of time that inferior trains will allow in **clearing the time** of superior trains at special points where pars. 279 and 280 do not apply for some local reason.

FREIGHT.

470. All supplies must be shipped on **shipping bills** or receipts for freight received. One copy is sent by mail to the consignee and one copy is held by the station agent where the freight was received. In loading supplies, endeavor should be made to load each car to its full capacity, if this can be done and not mix shipments to too great an extent. Hay and hard-tack are examples of supplies that utilize only about two-thirds of the actual capacity of a flat car or gondola, whereas if loaded into a box car they utilize about 90% of the actual capacity. Other supplies, such as grain, flour, sugar, etc., must be loaded in box cars, and easily load the car to its full capacity without occupying all the space. For **important shipments** a copy of the receipt may be sent to the agent at the destination so that he may be ready to care for the shipment on its arrival.

471. All freight to be shipped on a military railway will be delivered to the agent in exchange for a receipt for goods shipped. This receipt will be of the simplest form, indicating the date of shipment, name of consignor and consignee, and address of each, the serial number of the receipt, a list of the packages, with weight, marks, and contents of each. The agent or clerk will keep a duplicate of the receipt and will ship the freight on a waybill. The original receipt is delivered to the consignor to be sent to the consignee (pars. 470 and 473).

472. The **waybill** will be given the conductor of the train carrying the goods, and will indicate the routing desired in addition to the information contained in the receipt.

473. The conductor who first receives the waybill turns it over to the yardmaster at the end of his run. The latter delivers the waybill to the conductor who next takes the car. This is continued to the destination of the car, and the waybill and freight are there delivered to the receiving agent, who takes a list of the door seals, checks the freight against the waybill, and delivers the freight to the consignee, taking up the original receipt for goods shipped, or taking an **informal receipt** if the original has not been received by the consignee and the latter is known by the agent to be responsible.

474. Quick dispatch, time, slow, and local freight should be shipped on **differently-colored waybills,** so that the character of shipment will appear at a glance.

Content carries no copyright
This electronic image Copyright, 2000, George Schreyer, all rights reserved