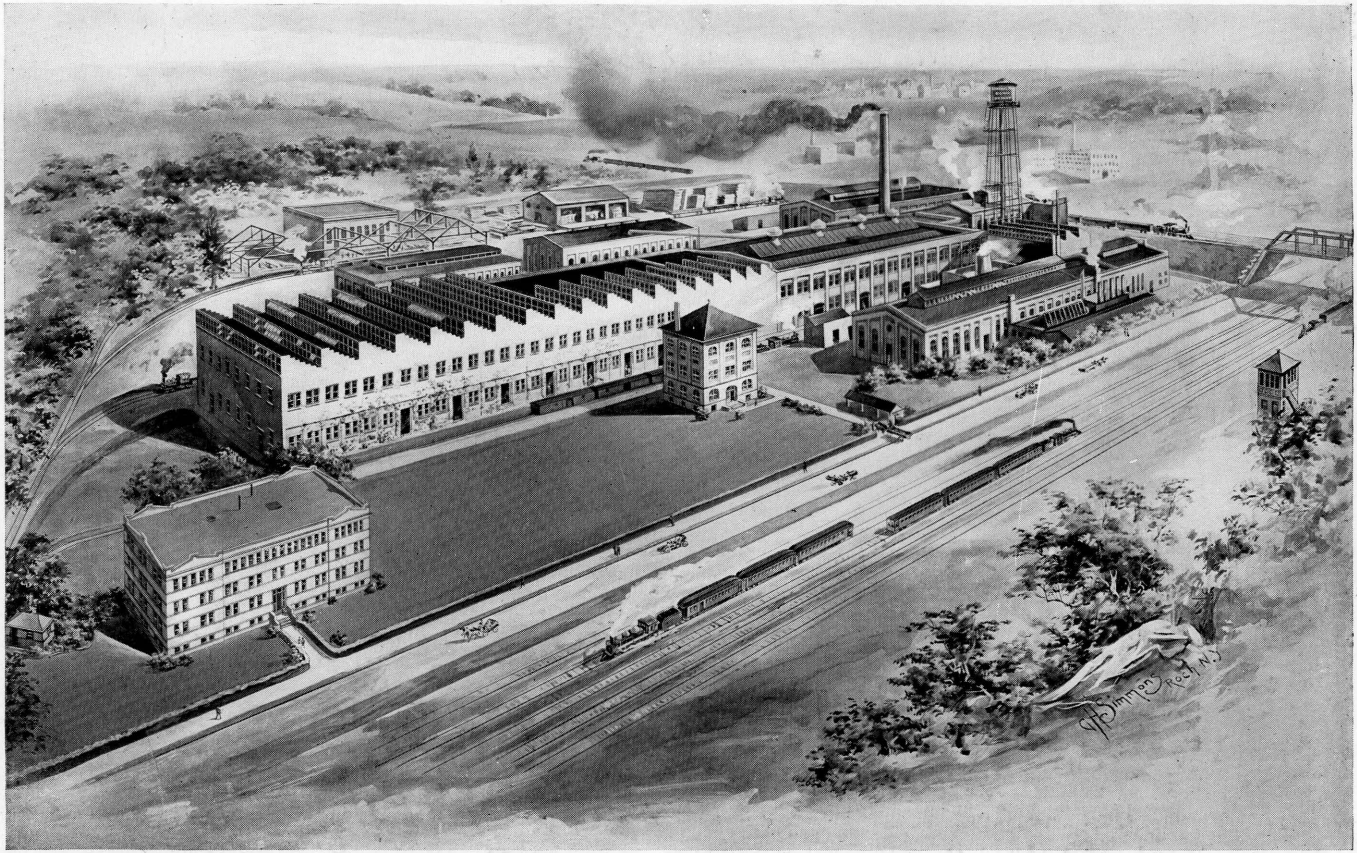
GENERAL RAILWAY SIGNAL COMPANY.

1911

BULLETIN No. 115-A

SUPPLEMENTING CATALOGUE, SECTIONS 1, 2 AND 5

MODEL 2A SIGNAL



MAIN OFFICE AND FACTORY OF THE GENERAL RAILWAY SIGNAL CO., AT ROCHESTER, N. Y.

GENERAL RAILWAY SIGNAL COMPANY.

ROCHESTER, N.Y.

BLOCK SIGNALS

AUTOMATIC
SEMI-AUTOMATIC
CONTROLLED MANUAL
FOR
STEAM AND ELECTRIC ROADS

INTERLOCKING

ELECTRIC
PNEUMATIC
MECHANICAL
ELECTRO-MECHANICAL
TO MEET ALL CONDITIONS

TUNNEL SIGNALS

THE MOST EFFICIENT AND COMPACT MADE

CROSSING GATES

MECHANICAL AND ELECTRICAL

SELECTIVE CALLING

APPARATUS FOR TELEPHONE TRAIN
DISPATCHING

PLANS, ESTIMATES, PROPOSALS AND DESCRIPTIONS UPON REQUEST

BRANCH OFFICES

CHICAGO
1248 PEOPLE'S GAS BLG.

MONTREAL
506 EASTERN TOWNSHIPS BANK

NEW YORK
708 NIGHT AND DAY BANK

DELIVERY

Experimental design shown at Chicago, March 15th, 1909
First Commercial Shipment . . August 10th, 1909

DELIVERIES TO SEPTEMBER 20th, 1910

New York Central Lines	547	
Northern Pacific	390	
Northwestern Line	312	
Pennsylvania System	219	
N. Y. N. H. & H.	183	
Great Northern	130	
Baltimore & Ohio	66	
C. H. & D.	48	
C. M. & St. P.	46	
C. N. O. & T. P.	43	
H. B. & T. Co.	40	
D. R. T. Co.	36	
C. & A.	35	
W. W. P. Co.	30	
C. R. I. & P.	21	
A. T. & S. F.	20	
I. C.	10	2176
Miscellaneous		76
		2252
On Order		617
Total		2869

THE GENERAL RAILWAY SIGNAL COMPANY'S MODEL 2–A SIGNAL, illustrated and described herein, is the first universal mechanism ever designed. That it fills a long felt want is indicated by the sales (closely approximating 3,000) during the first year of its manufacture, details of which are tabulated on the opposite page.

It is, of course, obvious that no one mechanism can be manufactured that will meet, without any change, all of the various signaling requirements. Hence, in using the term "universal mechanism" above, is meant a signal mechanism which is designed to meet all requirements by means of the selection or combination of its parts. With this in mind, it may be stated that the MODEL 2–A SIGNAL mechanism may be used for operating either high or dwarf signals. For high signals, it may be located at the spindle or at the base of the mast, and any number of arms may be placed, up to the limit of the mast's capacity. There are no limitations on signal aspects, that is, they may be two or three position, upper or lower quadrant, right or left hand, and any angle of movement. Also, there are no limitations as to power, as it is supplied to operate on Direct Current, ranging from 10 to 650 volts, or, on Alternating Current, ranging from 55 to 220 volts, and finally, it may be controlled by an interlocking lever only, semi-automatically or automatically, and in no case requires either a slot or a dashpot.

It has great advantages where it is desired to carry block signaling through existing interlocking plants on account of the facility with which it may be attached to present poles, and will be found almost indispensable to any one desiring to use one mechanism for all classes of signals including dwarfs.

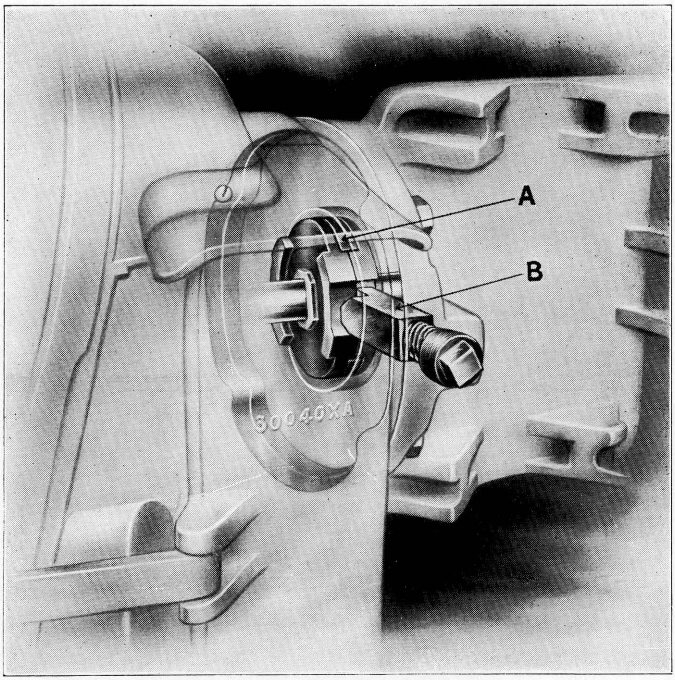


FIG. 1

Clamp Bearing

The mechanism is exceptionally strong and is attached to high signal masts by means of a clamp bearing, which is separate from and bolted to the mechanism proper. It carries the stop plate and semaphore shaft, both of which are supplied to fit the particular style of spectacle in use.

Coupling

The spectacle shaft is connected to the mechanism by means of the coupling shown in Figure 1, which is provided to insure the free action of the two shafts which otherwise would have to be "lined up" with an accuracy impracticable in commercial production.

The necessary variation in alignment is obtained by making the part "A", the general appearance of which is indicated by the visible surface of the driver, fit loosely between the driving and driven parts.

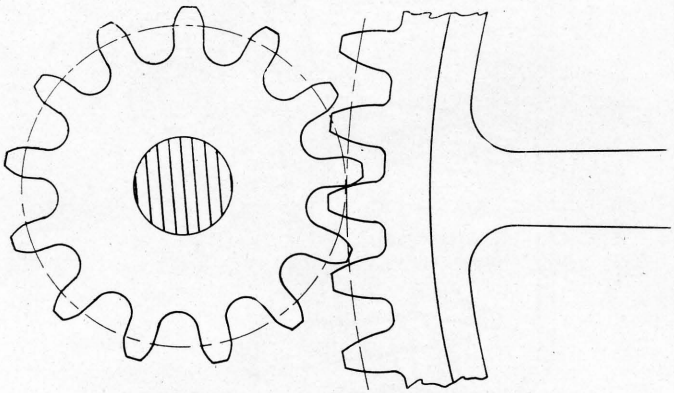


FIG. 2.
Clearance of Gears.

The clutch also furnishes a means for locking the signal in any desired position. This is accomplished by means of the dog "B", a square-sided notch in the driven and a sloping sided notch in the driving parts, which are arranged so that there is sufficient lost motion to permit the sloping edge of the driving part to engage with the beveled edge of the dog, thereby lifting the dog out of the square notch in the driven part. It is obvious that this same lost motion will prevent the lifting of the dog (by the engagement of the square shoulders) if an attempt is made to move the signal by hand.

Gears

The motor is connected to the semaphore shaft by means of a low reduction gearing, which requires but 30 revolutions of the armature to clear the signal to 90°. The strength and clearances of the teeth are very clearly shown in Figure 2, which is drawn to full size.

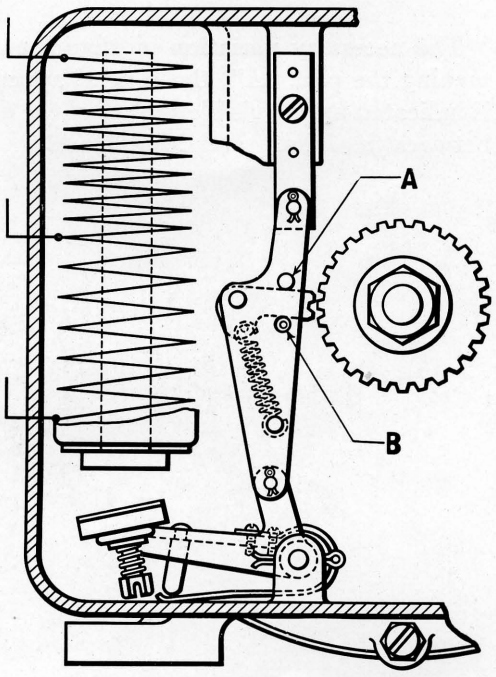


FIG. 3.

Service has demonstrated that gears of this character can be driven backwards with perfect safety. The power required in this instance is five (5) foot pounds at the semaphore shaft.

Bearings

It has not been found necessary to go to any unusual construction of bearings.

Ball bearings are used for the motor armature shaft, and roller bearings for that of the first Intermediate gear. service experience has demonstrated that the operation of the signal is greatly improved thereby, and that the additional cost of such bearings is fully warranted by the improved service obtained by their use.

Motors

At present 3 styles of motors are provided as follows: High voltage direct current, low voltage direct current and alternating current. The 110 volt D. C. and the A. C. motors are wound, and controlled by the circuit breaker, so that the motor alone holds the arm in any desired position.

Retaining Mechanism

The low voltage motors are provided with an electro-mechanical lock for the armature shaft, which is clearly shown in Figure 3. This lock is the same in principle as that first used, but is mechanically stronger and less delicate in its adjustments. The pin "A" is placed as shown or in hole "B", depending on the aspect of the signal: that is, as shown for upper quadrant and in the other hole for lower quadrant aspects.

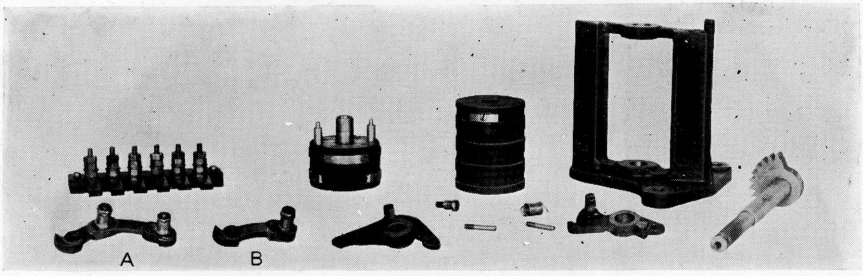


FIG. 4.
Detail of Circuit Breaker.

Circuit Breaker

The circuit breaker shown in detail in Figure 4 is a complete unit connected directly to the operating shaft by means of segmental gears so keyed and secured that accidental disconnection cannot possibly occur, and is adjustable to meet manufacturing variations of the blade grips.

The brushes are made broader than the contact plates, which latter are set in grooves in the commutator. This arrangement divides the brush bearing surface so that in one position one portion rests on the contact plate and in the other position another portion rests on the insulating surface. This prevents the dragging of metallic particles onto the insulation with its resultant arcing and destruction. All brushes are adjustable and securely locked in position.

The contact plates are screwed to a cylindrical commutator made of treated hard wood and are easily moved or replaced.

The commutator is arranged to "drag", when low voltage circuits are controlled, and to "snap" for high voltage circuits where quick break is essential. It may be equipped for 12 circuits, including those required for local control of the signal, and a wide variation of combinations of "snap" and "drag" contacts.

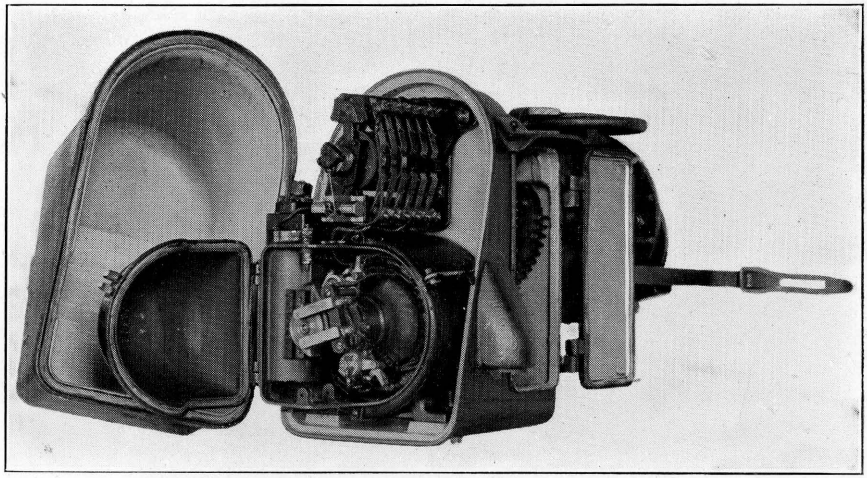


FIG. 5.
Model 2-A Signal. A. C. Mechanism.

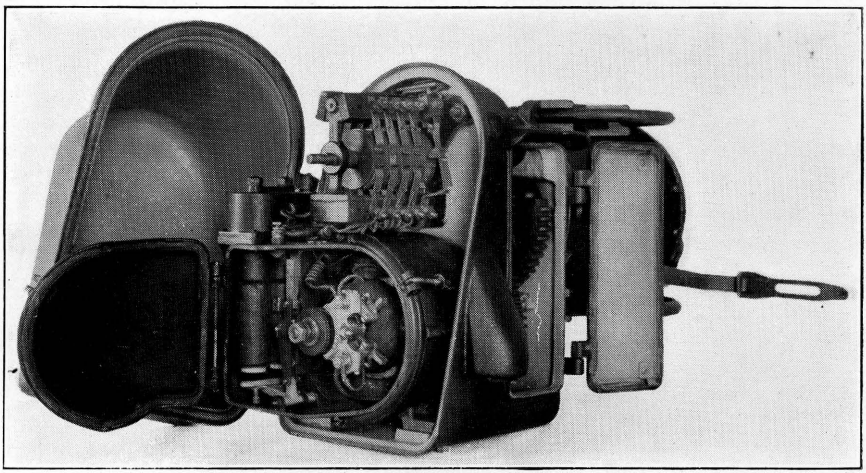


FIG. 6.
Model 2-A Signal 10 Volt D. C. Mechanism.

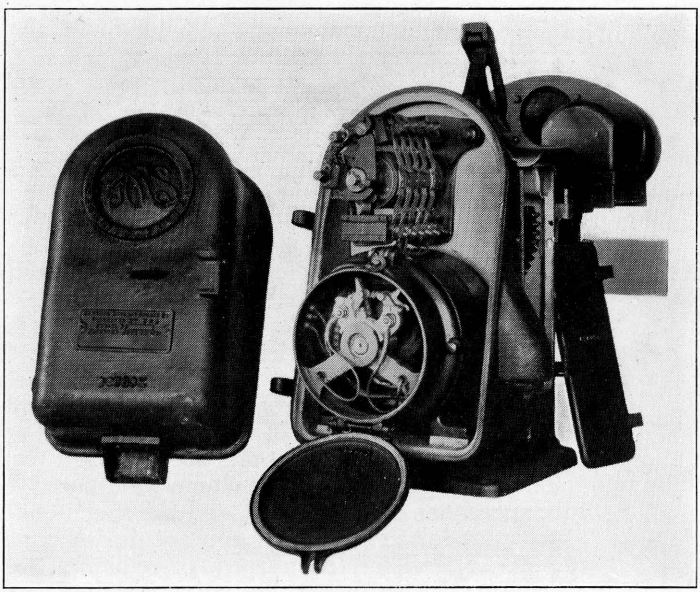


FIG. 7.
Model 2-A Signal. 110 Volt D. C. Mechanism.

Operation

The voltage, current and time of clearing of the various types of signals (dependent on the torque and degrees of travel of the spectacle) are as follows:–

Low Voltage—10 volts, D. C.
$1\frac{1}{2}$ to $2\frac{1}{2}$ amperes
6 to 12 seconds.

High Voltage—110 volts D. C.
$\frac{3}{4}$ to 1 ampere
3 to 5 seconds
(dependent also on the line resistance.)

Alternating Current
$\frac{6}{10}$ to $2\frac{1}{2}$ amperes
4 to 6 seconds
(dependent also on voltage and frequency of current.)

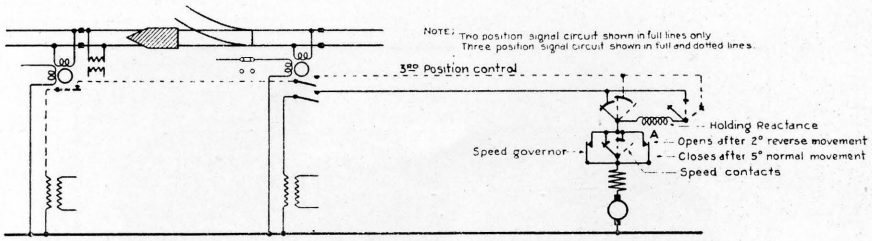


FIG. 8.

Circuits

The various circuits shown are, in general, self-explanatory.

In the circuit for the A. C. operated signal (Figure 8), special attention is called to the fact that the third position is controlled over a line wire without the use of a line relay, and is possible on account of the small current consumption of the type of motor used.

The circuit breaker contacts are arranged to drag.

The speed governor opens after a predetermined armature speed has been reached, and the speed contacts act as a shunt for the governor contact during a portion of the stroke, and for the purpose of reducing the time of clearing. The contact A, operating as noted, is provided to start the signal immediately, regardless of the position of the governor and speed contacts, when the operating current is momentarily interrupted and re-applied.

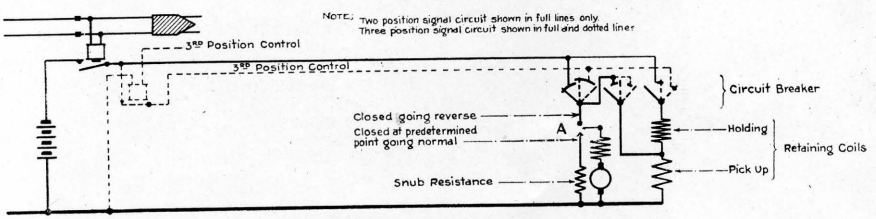


FIG 9.

The circuit for the low voltage block signal (Figure 9) needs no explanation, the circuit breaker contacts are all arranged to drag. Contact A is a snubbing contact, which short circuits the motor when the signal is returning to the normal position.

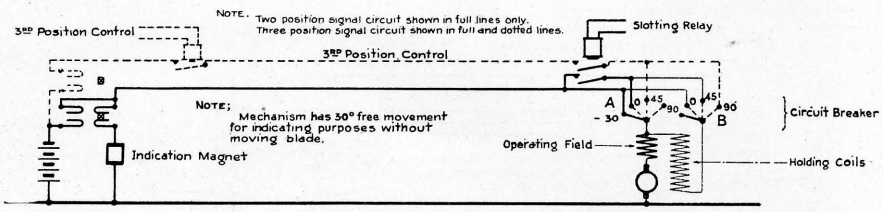


FIG. 10.

The circuit for the interlocked signal with dynamic indication (Figure 10) is shown with a track control, which may, of course, be omitted if slotting is not required.

The circuit breaker contact A snaps in both directions, and may be so arranged that the lever must be returned to the normal position (after the signal has been returned to the normal position by the track control) before another movement can be made; or, it may be arranged so that the signal will clear as soon as the track circuit is vacated if the lever is still reversed.

B is a drag contact.

The indexes, 0°, 45°, 90°, represent the positions of the circuit breaker corresponding to the stop, caution and proceed positions of the signal arm. The index – 30 shows the position of the circuit breaker at the beginning of the 30° free movement, which may be considered negative, that is, produces no movement of the signal arm.

The holding coils are a part of the motor windings.

It will be noted that this circuit is much simpler than the one previously used, that it does not require a special lever in the interlocking machine and that the preliminary free movement permits testing of the signal at all times whether the controlling track circuit is occupied or not. This is of great advantage in busy locations where the operators are required to make test movements of all levers when coming on duty.

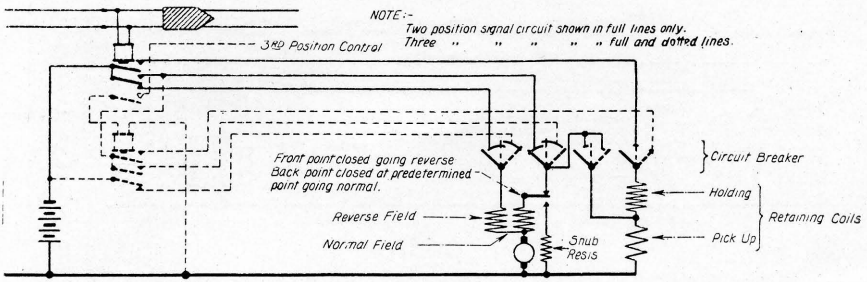


FIG. 11

The same circuit is used for power operated distant signals controlled from mechanical interlocking machines by substituting a mechanically operated citcuit breaker, and a style B dynamic indication lock for the electric lever controller and indication magnets shown in the circuit plan.

Figure 11 shows the arrangement of circuits when it is required that the signal shall return to the normal position by the application of power. This is accomplished by supplying current to a reverse field winding, and is in no way dependent on the return of any portion of the signal mechanism to its normal position. The current is supplied direct to the field winding from the back contacts of the controlling relay.

All circuit breaker contacts are drag.

Figures 12 to 18 inclusive are typical illustrations of installations on various railroads.

Figure 19 is an application as a highway crossing signal.

Figures 20 and 21 show our assembly department, and Figure 22 shows one of our recent shipments.

Further information, including prices, estimates, etc., will be gladly furnished upon request.

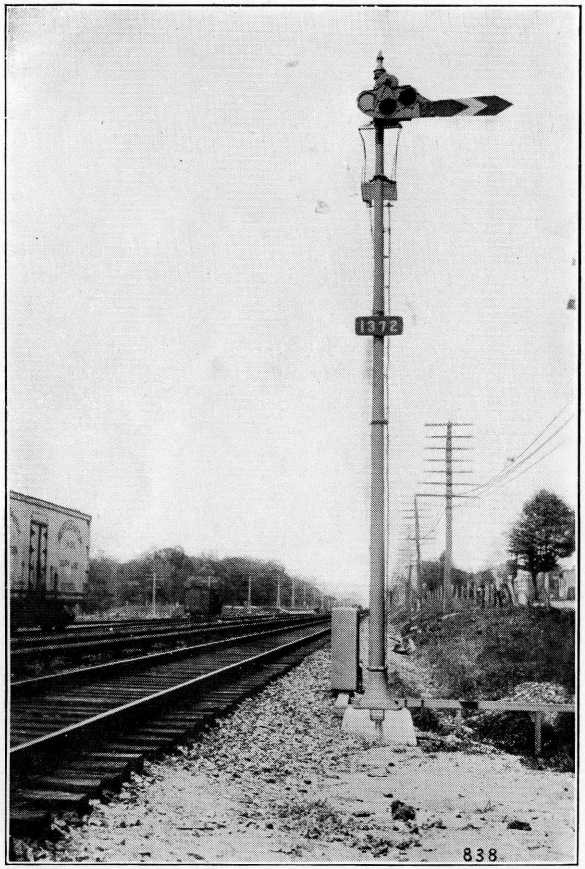


FIG. 12—Model 2-A Signal. A. C. Mechanism, Automatic Block System N. Y. C. & H. R. R. R Electric Divison

FIG. 13—Model 2-A Signal. 10 Volt Mechanism Automatic Block System, B. & O. R. R.

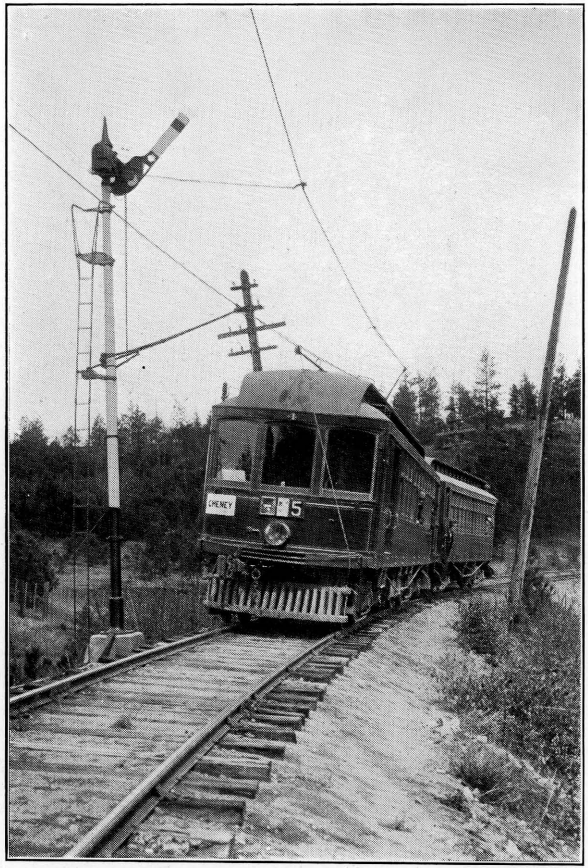


FIG. 14—Model 2-A Signal. A. C. Mechanism, Automatic Block System, W. W. P. Co.

FIG. 15—Model 2-A Signal. 10 Volt Mechanism, Automatic Block System, N. P. R. R.

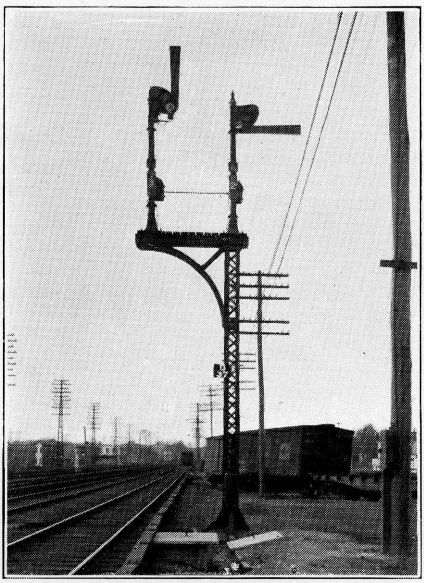


FIG. 16—Model 2-A Signal. A. C. Mechanism, Automatic Block System, L. I. R. R.

FIG. 17—Model 2-A. A. C. Suspended Signals, N. Y., N. H. & H. R. R., Woodside, N. Y.

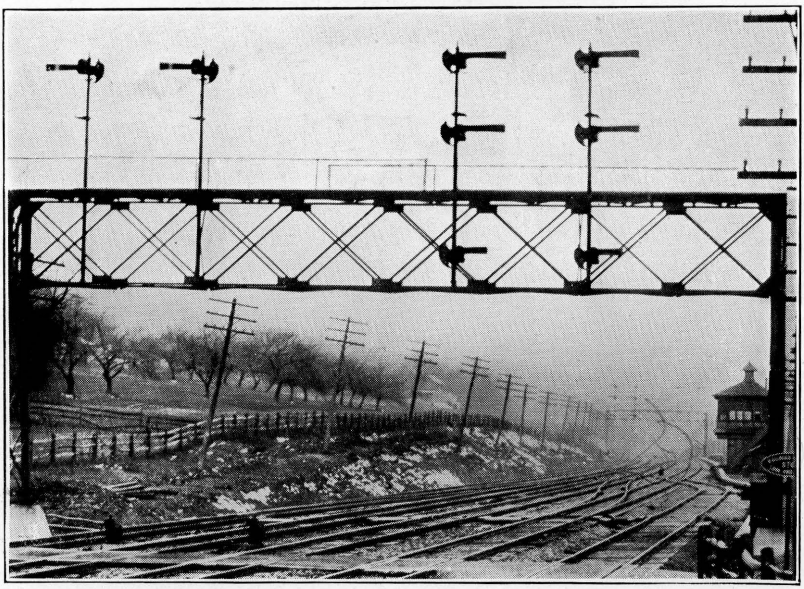


FIG. 18—Model 2-A Signals. 10 Volt Mechanism, Interlocked, P. R. R.

FIG. 19—Model 2-A Signal. 10 Volt Mechanism, Highway Crossing Signal, L. I. R. R.

FIG. 20—Model 2 A Signal. Assembly Dept.

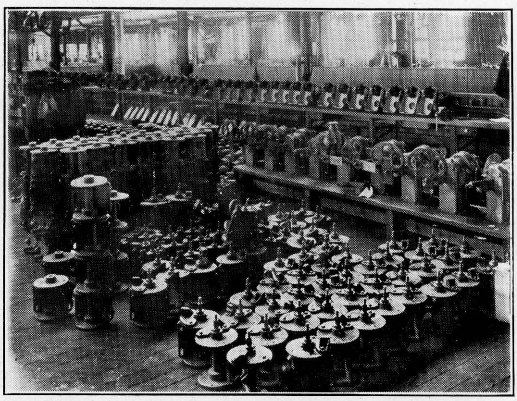


FIG. 21—Model 2-A Signal. Assembly Dept.

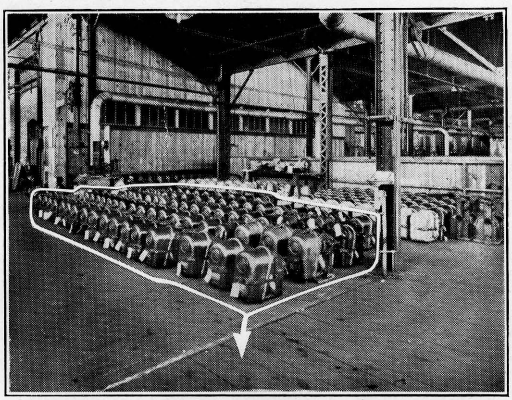


FIG. 22—Model 2-A Signal. Typical Shipment.

GENERAL RAILWAY SIGNAL COMPANY.

1911

BULLETIN No. 115-A

SUPPLEMENTING CATALOGUE, SECTIONS 1, 2 AND 5

MODEL 2A SIGNAL