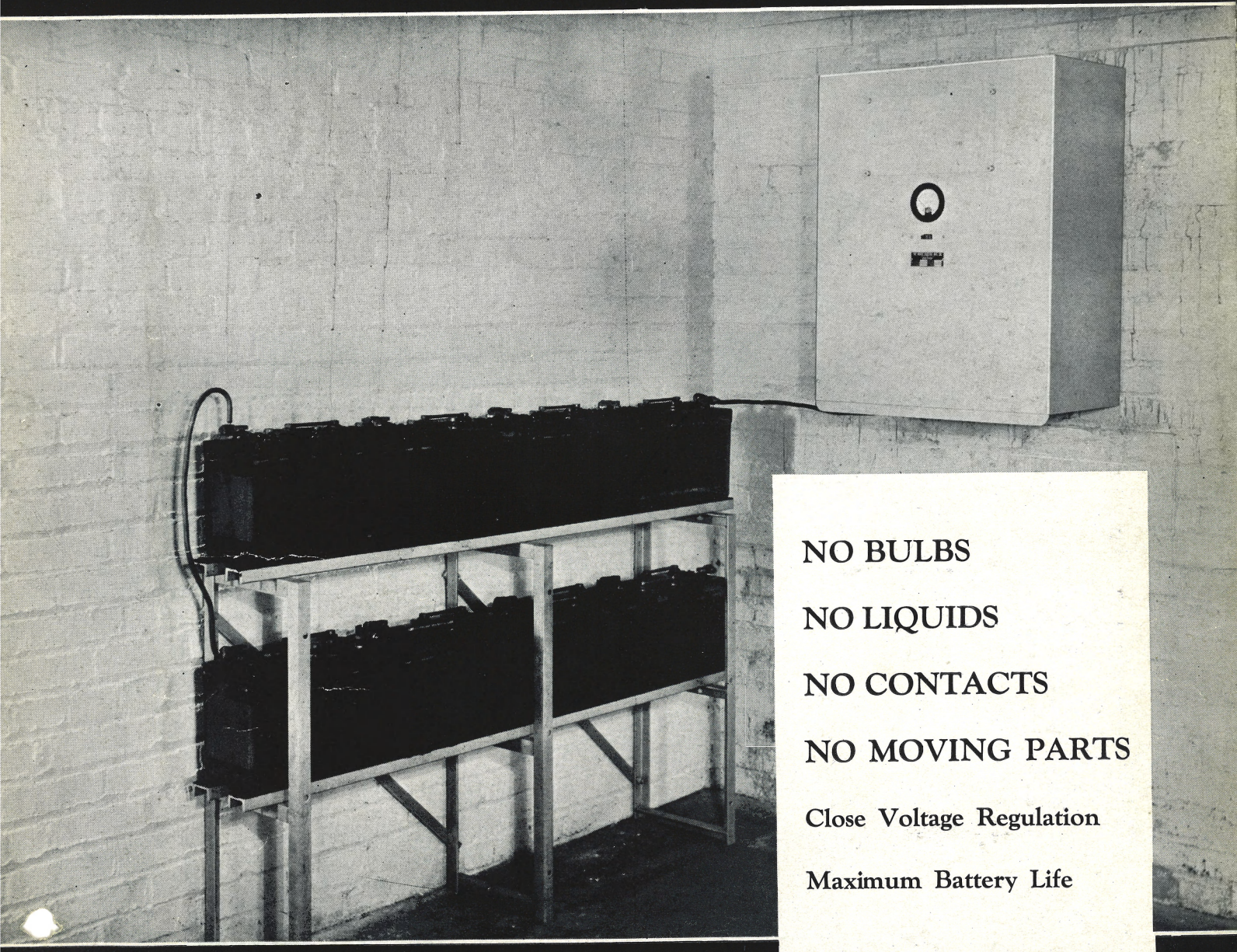
NORTH SELF-REGULATING BATTERY CHARGERS



NO BULBS

NO LIQUIDS

NO CONTACTS

NO MOVING PARTS

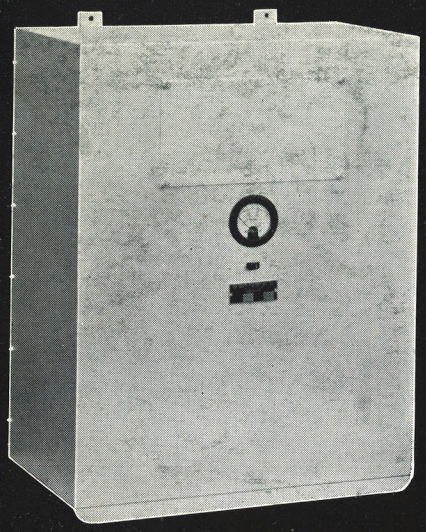
Close Voltage Regulation

Maximum Battery Life

THE NORTH ELECTRIC MANUFACTURING Co.

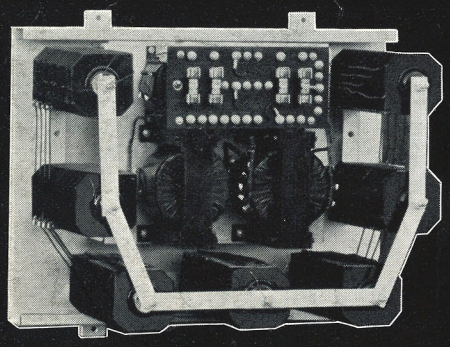
THE OLDEST INDEPENDENT MANUFACTURER — GALION, OHIO — IN OPERATION CONTINUOUSLY SINCE 1884

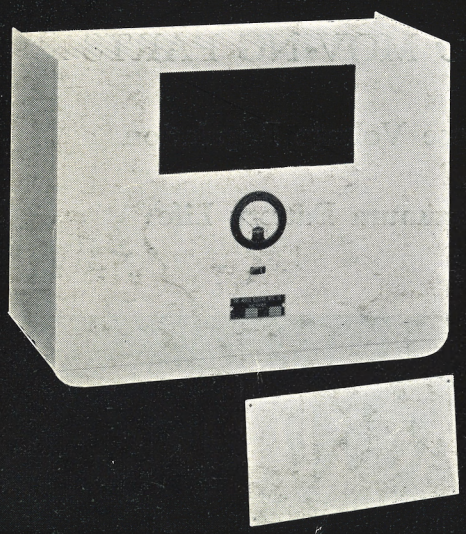
NORTH



CABINET TYPE CHARGERS

The charger unit is mounted on a rigid back plate. The cover is removable allowing access to the entire unit.





GENERAL DESCRIPTION

The North Self-Regulating battery charger is designed to provide maximum efficiency in the operation of full-float storage battery systems. The charger accomplishes this by automatically maintaining the voltage of the system battery within the limits of its most efficient range of operation under conditions of varying loads.

Battery manufacturers recommend that for best performance a battery be kept in as near a fully charged condition as is practicable. Excessive overcharging and prolonged heavy discharge under load conditions are to be avoided, as extremes in either direction are apt to have a deleterious effect upon the life of the battery. Discharged batteries should not be allowed to stand for any period of time in this condition, but should be restored to full charge as soon as possible upon cessation of the load. Adherence to these general rules of battery care will result in increased performance in any storage battery system.

The North Self-Regulating battery charger ensures efficient working of the battery by constantly checking its condition of charge in comparison with the total load on the system. The output of the charger is automatically varied to meet the load demands and at the same time maintain the battery in as near to a fully charged condition as load variations will permit.

The use of a North Self-Regulating battery charger in any common battery system, whether manual or automatic, provides essentially full-float operation with its consequent reduction in battery activity. This results in greatly prolonging the life of the battery and in reducing the battery attention to an occasional check of the electrolyte level. In most cases it will be found necessary to add water to the batteries but once or twice a year.

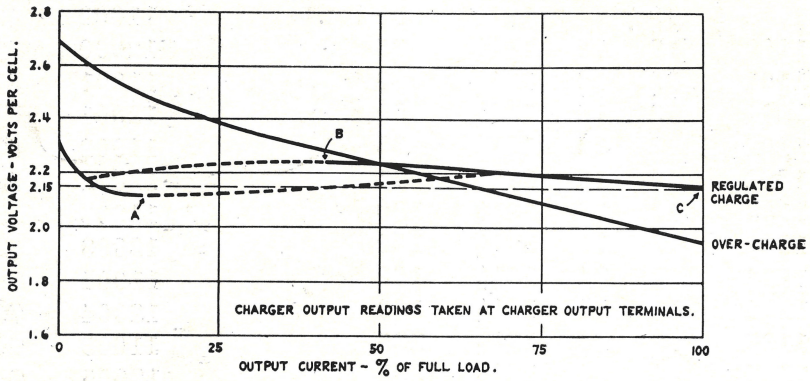
CHARGER SETTINGS

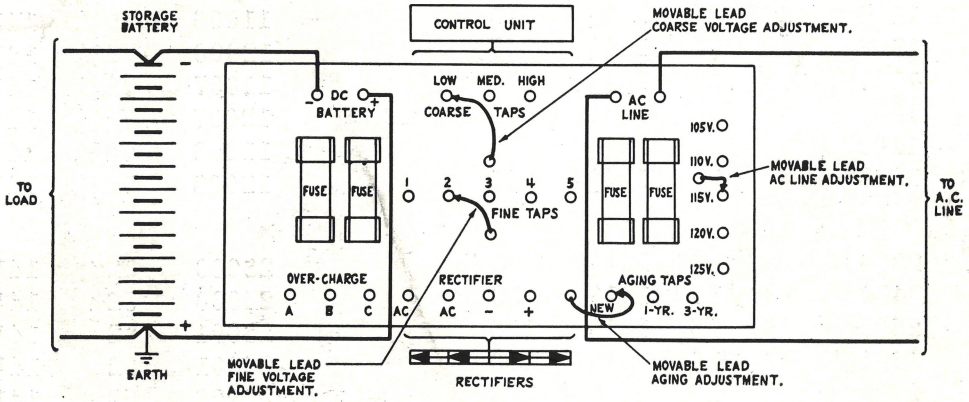
The rectification and control of the charging current is accomplished without the use of bulbs, liquids, contacts, moving parts or timing devices of any kind so that the charger units require a minimum of attention. In all chargers variable taps are provided, to allow field adjustments to be made for variations in A. C. line voltage, aging of the rectifying elements, prevailing temperature conditions, and, in a measure, load conditions. The settings required for any particular installation are easy to make and once made seldom need be changed.

No Moving Parts

SELF-REGULATING

CHARACTERISTIC CURVES: RELATION OF CELL VOLTAGE TO CHARGER OUTPUT.





SCHEMATIC SHOWING CHARGER CONNECTIONS.

VOLTAGE CONTROL

The charger tests the battery continuously. When the battery is at full charge, the charging current is reduced to negligible proportions. An increase in the system load results in a drop in battery voltage. When this drop in voltage reaches a critical point known as the cut-in point (designated by A on the accompanying graph) the control elements function to produce a compensating increase in charger output current. The charging current may supply all or part of the system load depending upon the load and capacity of the charger. The value of the load at any time after cut-in and before cut-out determines the amount of charging current delivered to the battery.

If the system load is still further increased, the charger out-put increases up to the capacity of the charger as designated by point C on the graph. The design of the charger is such that it may be operated indefinitely at full rated capacity with no injurious effects.

If the load on the system diminishes, a greater percentage of the output current is diverted to charging the battery, thereby raising the battery voltage until another critical point is reached, known as the cut-out point, (designated by B on the accompanying graph). At this point the control elements function to reduce the charger output current, and the charger resumes its standby condition in which the charger tests the battery continuously. When a load again appears on the system, the slight drop in battery voltage causes the charger to resume the load and the cycle is repeated.

A hand-operated switch is provided to render the regulating element of the charger inoperative for the purpose of supplying an equalizing charge to the battery whenever this is deemed necessary.

The regulation of system voltage which can be maintained under conditions of widely fluctuating loads is a valuable feature of this charger. The best control is of course obtainable with a battery and charger suitably proportioned for the service conditions.

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ATTERY CHARGERS

RECTIFYING ELEMENTS

opper-oxide rectifying stacks are employed to rectify e alternating current. The use of copper-oxide rectifyg units instead of bulbs, liquids or contacts to convert ernating current to direct current has well-known adıtages apart from the practically unlimited life of the ıcks, and their use has contributed materially to the eliability of the charger.

he rectifying stacks are specified with liberal margins afety in all sizes of chargers. This ensures that the hargers will meet their standard ratings and not be adersely affected by occasional overloads that may be enountered in service. It is expected that the useful life of he charger without replacements or repairs will approximate the life of the telephone exchange equipment.

In applications where tube rectification would be satisfactory, and in which a substantial over-all saving may be found, North Self-Regulating Battery Chargers employing tube type rectification can be supplied. The North Company's engineers will be glad to study and make recommendations in any specific case in which the question of the type of rectification may be involved.

TRANSFORMERS

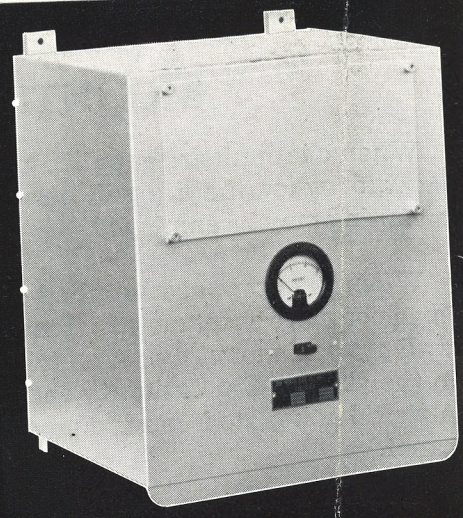
The transformers and chokes are constructed of highest quality transformer steel cores and they are wound and tested under the most exacting specifications. The specifications ensure that the transformers will have the ruggedness and reliability that are essential in a charger which is designed to reduce maintenance in a storage battery direct-current supply system.

NOISE SUPPRESSION

A suitable reactance is inserted in the output of the telephone type chargers so that under maximum rated load the system is entirely free from charger-ripple.

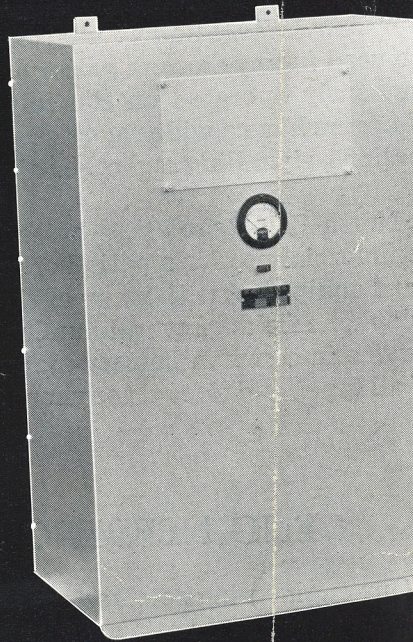
The charger has no sources of radio interference in its structure, consequently no disturbing effect need be anticipated from its operation.

Close Voltage Regulation



CABINET TYPE MOUNTING for SMALL CHARGERS

The charger units are housed in aluminum finished steel cabinets arranged for wall or shelf mounting.



CABINET TYPE MOUNTING for LARGER SIZED CHARGERS

Any desired rating may be obtained by operating the charger units in parallel.

BATTERY CHARGER

MOUNTINGS

When chargers are supplied with central office equipment, or when the use will permit, a rack or panel type mounting may be employed.

When chargers are supplied alone, they are mounted in one or more sheet metal cabinets, which are suitable for wall or shelf mounting. A metallic grille-work is inserted in the sheet metal casing to ensure adequate ventilation. A rigid back plate is used to mount the stacks and control panel.

Other mountings will be devised when the requirements of the application are such that the cabinet or rack type mountings are not suitable.

APPLICATIONS

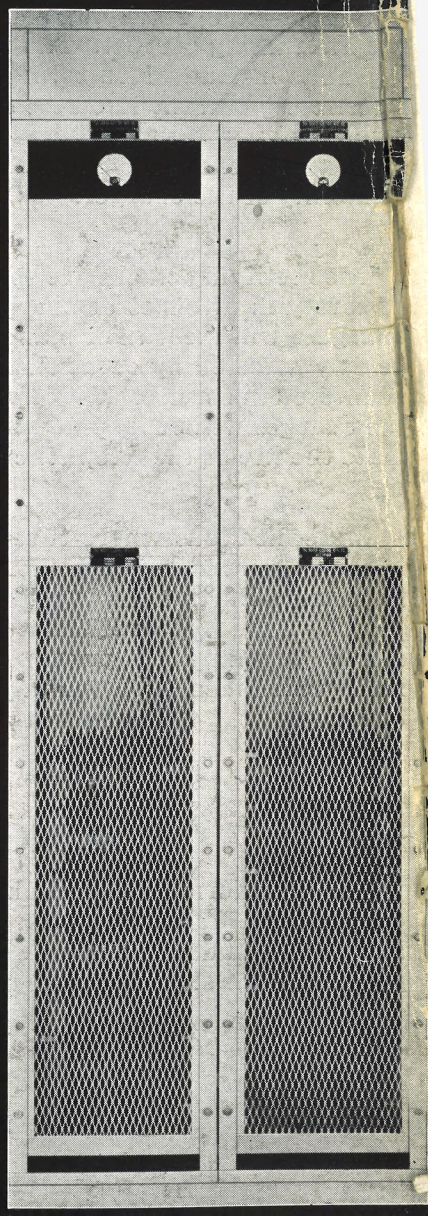
The North Self-Regulating battery charger is one of the latest in a long series of contributions to the maintenance-free operation of telephone exchanges. Although these chargers were developed primarily for use with the North Company's "All-Relay" unattended dial offices, they can be used in any storage battery system that can be advantageously operated on the full-float basis. Hence these chargers have a wide range of application in the communications, signalling and other allied fields.

North Self-Regulating battery chargers have been in commercial use for a period of several years and are standard equipment with many of the largest companies in the telephone field. Several hundred of these chargers are in service in common battery manual and automatic offices of all types and sizes throughout the country.

ENGINEERING SERVICES

Our engineering services are available to any company desiring improved battery charging equipment. We shall be glad to send one of our representatives for a discussion of the application of this equipment to your problems.

Maximum Battery Life



12 AMPERE CHARGER
PANEL TYPE MOUNTING

Two six ampere panel type chargers operated in parallel to obtain 12 ampere rating.

SPECIFICATIONS

NORTH SELF-REGULATING BATTERY CHARGERS

Telephone Type

Quotations on North Self-Regulating Chargers for any number of cells and any desired rating will be supplied upon request.

To obtain chargers of more than 8 amperes rating any of these units may be operated in parallel.

Battery Cells	Ampere Rating	CABINET TYPE Type No.	Dimensions Ht.	Wd.	Dp.	Shpg. Wt.	PANEL TYPE Type No.	Rack Dimensions Ht.	Wd.	Dp.	Shpg. Wt.
11	0.5	1100	18″	16″	13½″	85 lbs.	11000	52″	14½″	9″	150 lbs.
12	0.5	1200	18	16	13½	85	12000	52	14½	9	150
11	1.0	1101	18	16	13½	90	11001	52	14½	9	150
12	1.0	1201	18	16	13½	90	12001	52	14½	9	150
11	2.0	1102	18	16	13½	95	11002	52	14½	9	155
12	2.0	1202	18	16	13½	95	12002	52	14½	9	155
11	3.0	1103	18	16	13½	130	11003	52	14½	9	190
12	3.0	1203	18	16	13½	130	12003	52	14½	9	190
11	4.0	1104	18	24	13½	160	11004	76¼	14½	9	245
12	4.0	1204	18	24	13½	160	12004	76¼	14½	9	245
11	5.0	1105	30	24	13½	235	11005	76¼	14½	9	280
12	5.0	1205	30	24	13½	235	12005	76¼	14½	9	280
11	6.0	1106	30	24	13½	245	11006	76¼	14½	9	305
12	6.0	1206	30	24	13½	245	12006	76¼	14½	9	305
11	7.0	1107	30	24	13½	270	11007	76¼	14½	9	335
12	7.0	1207	30	24	13½	270	12007	76¼	14½	9	335
11	8.0	1108	30	24	13½	280	11008	76¼	14½	9	345
12	8.0	1208	30	24	13½	280	12008	76¼	14½	9	345
23	0.5	2300	18″	16″	13½″	90 lbs.	23000	52″	14½″	9″	150 lbs.
24	0.5	2400	18	16	13½	90	24000	52	14½	9	150
23	1.0	2301	18	16	13½	100	23001	52	14½	9	160
24	1.0	2401	18	16	13½	100	24001	52	14½	9	160
23	2.0	2302	18	16	13½	135	23002	52	14½	9	190
24	2.0	2402	18	16	13½	135	24002	52	14½	9	190
23	3.0	2303	18	24	13½	165	23003	52	14½	9	225
24	3.0	2403	18	24	13½	165	24003	52	14½	9	225
23	4.0	2304	18	24	13½	185	23004	76¼	14½	9	295
24	4.0	2404	18	24	13½	185	24004	76¼	14½	9	295
23	5.0	2305	30	24	13½	265	23005	76¼	14½	9	315
24	5.0	2405	30	24	13½	265	24005	76¼	14½	9	315
23	6.0	2306	30	24	13½	275	23006	76¼	14½	9	330
24	6.0	2406	30	24	13½	275	24006	76¼	14½	9	330
23	7.0	2307	36	24	13½	355	23007	76¼	14½	16	375
24	7.0	2407	36	24	13½	355	24007	76¼	14½	16	375
23	8.0	2308	36	24	13½	370	23008	76¼	14½	16	395
24	8.0	2408	36	24	13½	370	24008	76¼	14½	16	395

115 Volt 60 cycle chargers operating between the limits of 105-125 volts will be supplied unless otherwise specified.

230 Volt 60 cycle chargers can be supplied to operate between limits 200-250 volts.

Chargers can be supplied to operate on 25 or 50 cycle AC.

The type of AC voltage supply available should be clearly specified when ordering chargers.

The cabinet and rack type mountings shown in the table include most of the standard sizes. For any charger not listed obtain approximate dimensions and shipping weight from charger with next larger number of cells.

Specifications will be supplied for battery chargers for telegraph and signal applications upon request.

THE NORTH ELECTRIC MANUFACTURING COMPANY

GALION, OHIO