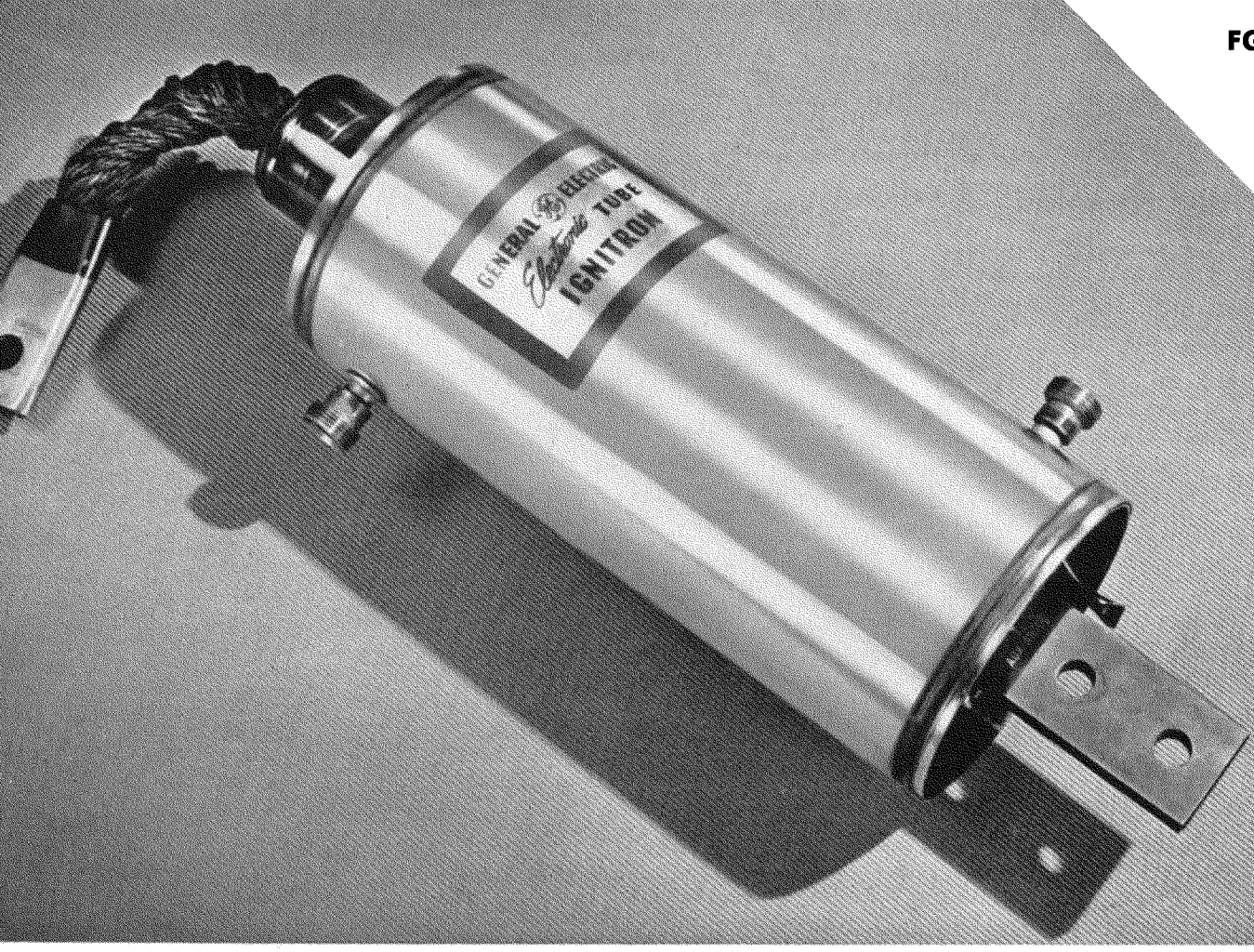


IGNITRON

SPECIAL DESIGN FEATURES

1. Stainless-steel, seam-welded construction
2. Uniform water cooling
3. Strong, compact design
4. Easy to install
5. Copper terminals
6. Flexible anode lead
7. Mercury-pool cathode allows extremely high instantaneous currents to be passed through the tube without damage.

DESCRIPTION

This steel-jacketed ignitron is designed for rectifier service in the 125-, 250-, 600-, and 900-volt d-c power fields. The FG-238-B is used for rectifiers rated up to 1000 kilowatts depending on the number of ignitrons used, the output voltage, and the circuit.

The FG-238-B is also rated for 2400-volt resistance-welder-control service and has a capacity of 2400 kilovolt-amperes in this service. The FG-238-B has a continuous average current rating of 200 amperes per tube for use in rectifiers rated up to 1000 kilowatts.

Arc losses are low. Phase control of the ignitron impulses permits voltage control of the rectified output. Excitation of the small auxiliary anode stabilizes the cathode spot for very small anode currents. Two ignitors, only one of which is used at a time, assure long life.

TECHNICAL INFORMATION

These data are for reference only. For design information refer to specifications.

GENERAL CHARACTERISTICS

Electrical

Voltage drop		
At 100 amperes instantaneous anode current	12.6	volts
At 300 amperes instantaneous anode current	14.1	volts
At 600 amperes instantaneous anode current	16.2	volts
At 1200 amperes instantaneous anode current	19.1	volts

Mechanical

Cathode		pool type
Number of ignitors	2	
Number of main anodes	1	
Number of auxiliary anodes	1	
Type of cooling		water
Typical flow	3 to 5	gallons per minute
Pressure drop at above flow	3 to 8	pounds per square inch
Temperature rise with lower rate of flow 300 amperes per anode	7	centigrade
Net weight, approx	25	pounds
Shipping weight, approx	35	pounds

MAXIMUM RATINGS

Rectifier Service—For Power Supply—Frequency of 25 to 60 Cycles, Phase Retard = 0

Maximum inverse and forward anode voltage	900	volts	2100	volts
Maximum anode current				
Instantaneous	1800	amperes	1200	amperes
Average continuous current	200	amperes	150	amperes
2-hour-average current over any 2-minute period	300	amperes	225	amperes
1-minute-average current over any 1-minute period	400	amperes	300	amperes
Surge current, maximum duration 0.15 second	12000	amperes	9000	amperes
Maximum outlet water temperature	60	centigrade	45	centigrade
Minimum inlet water temperature	6	centigrade	6	centigrade
Minimum water flow				
At continuous average anode current	3	gallons per minute	3	gallons per minute
At no load*	1.0	gallon per minute	1.0	gallon per minute

**For Systems in which the flow of water is controlled by the Load.*

Welder—Control Service—Ratings are for 2400 Volts Rms, Frequency of 25 to 60 Cycles

Maximum demand	2400	kva
Corresponding average anode current	135	amperes
Maximum average anode current	207	amperes
Corresponding demand	1105	kva
Maximum time of averaging anode current at 2400 volts, rms	1.66	seconds
Minimum water flow	3.0	gallons per minute
Maximum outlet water temperature	30	centigrade
Maximum surge current	6000	amperes
Maximum duration of surge current	0.15	second

Ignition Requirements (Ratings are the same for both Welder and Rectifier Service)

Ignitor voltage		
Maximum allowed, ignitor positive—same as anode voltage		
Maximum instantaneous allowed, ignitor negative	5	volts
Ignitor current		
Maximum instantaneous allowed	100	amperes
Maximum average allowed	2.0	amperes
Time of averaging current	10	seconds
Maximum ignition time	100	microseconds

TECHNICAL INFORMATION (CONT'D)

Anode firing (see elementary circuit K-9033528)

Maximum instantaneous ignitor potential required	150	volts
Maximum instantaneous ignitor current required	40	amperes
Typical resistance added to ignitor circuit for anode firing		
At anode voltage of 600 volts or less	4	ohms
At anode voltage of 601 volts to 1000 volts	10	ohms
At anode voltage of 1001 volts to 1500 volts	20	ohms
At anode voltage of 1501 volts to 2000 volts	35	ohms
At anode voltage of 2001 volts to 2400 volts	50	ohms
Separate excitation (see elementary circuit K-9033525)		
Minimum volt-ampere requirements for separate excitation		
Firing systems are shown on K-9033529		

Auxiliary Anode Requirements (Ratings are the same for both Welder and Rectifier Service)

Maximum average current	5	amperes
Maximum inverse voltage		
With main anode conducting	25	volts
With main anode not conducting	150	volts

FG-238-B

MINIMUM VOLT-AMPERE REQUIREMENTS FOR SEPARATE-EXCITATION FIRING SYSTEMS

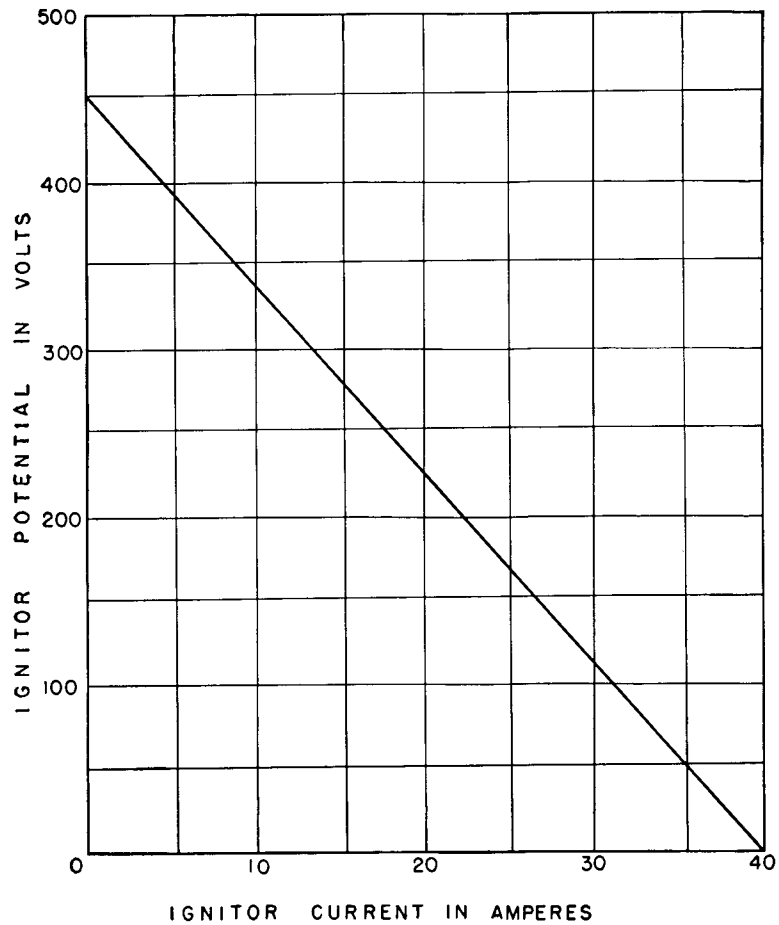


FIG. 2

K-9033529 11-15-44

FG-238-B

ELEMENTARY CIRCUIT FOR CAPACITOR FIRING

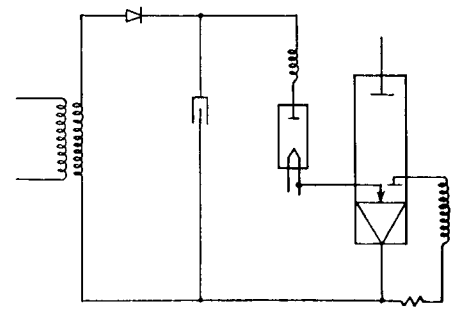


FIG. 1

K-9033525 11-15-44

FG-238-B

ELEMENTARY CIRCUIT FOR ANODE FIRING

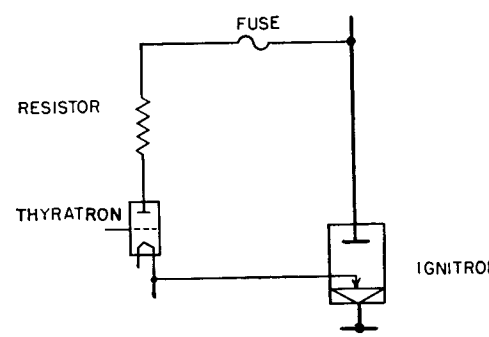
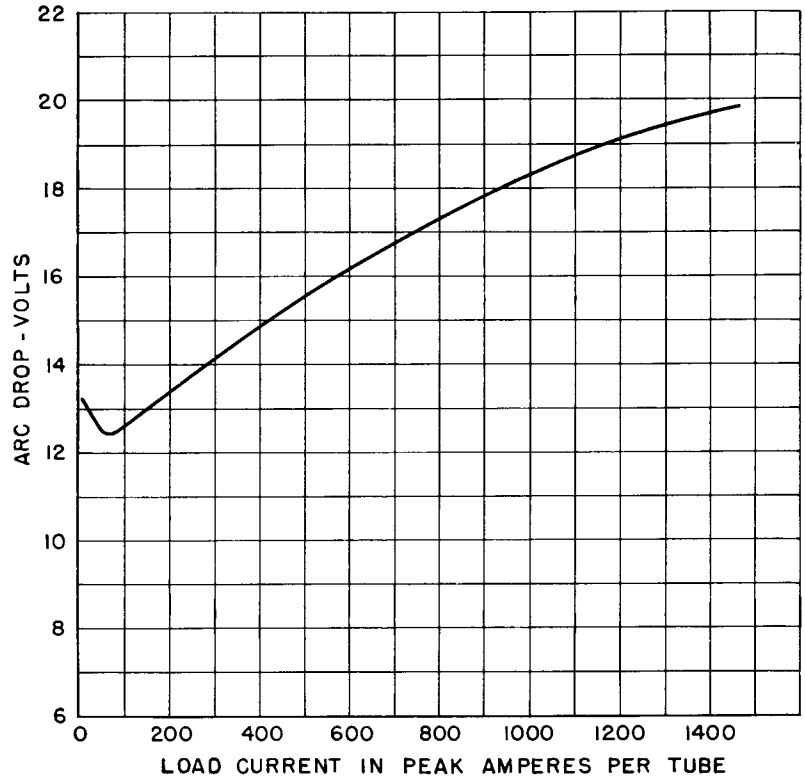


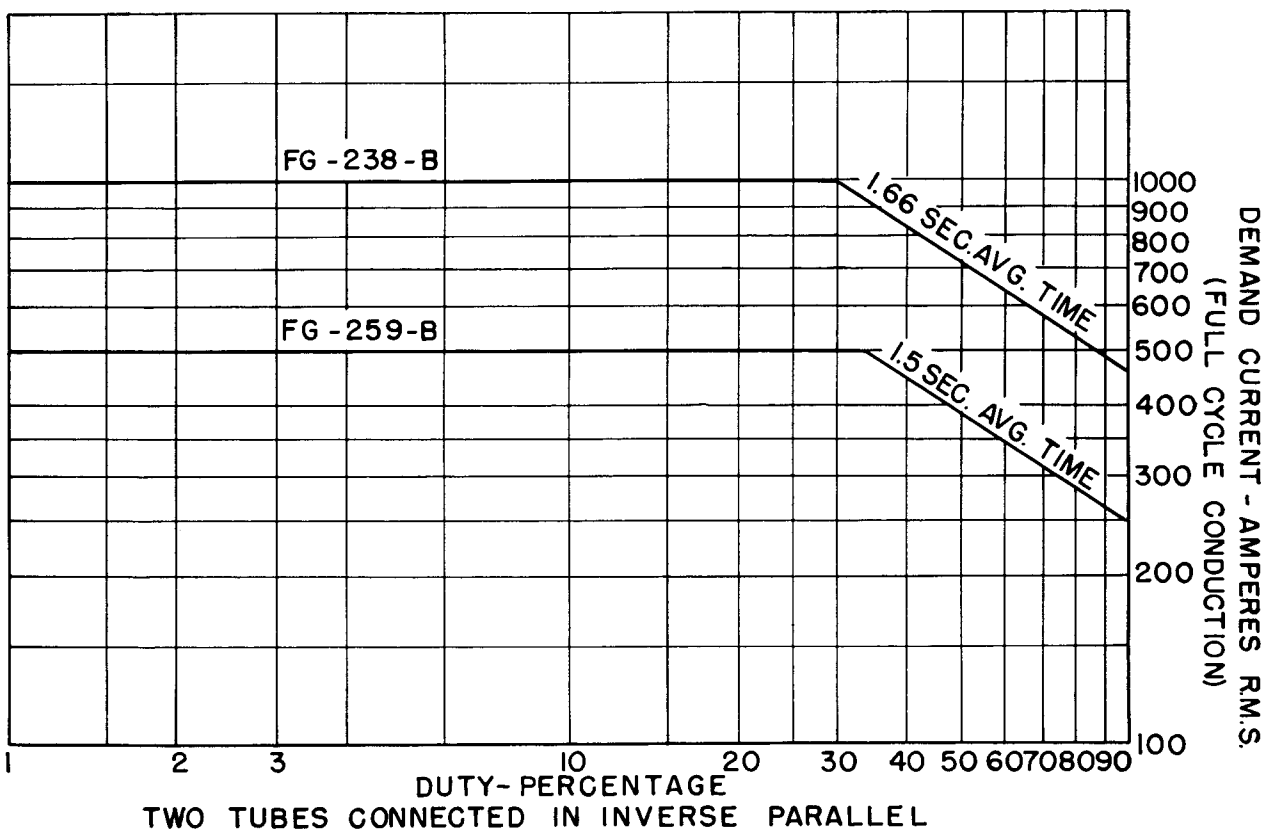
FIG. 3

K-9033528 12-16-44



FG-238-B ARC DROP, OUTLET WATER TEMPERATURE—40 C TO 60 C, WATER FLOW—3 GPM

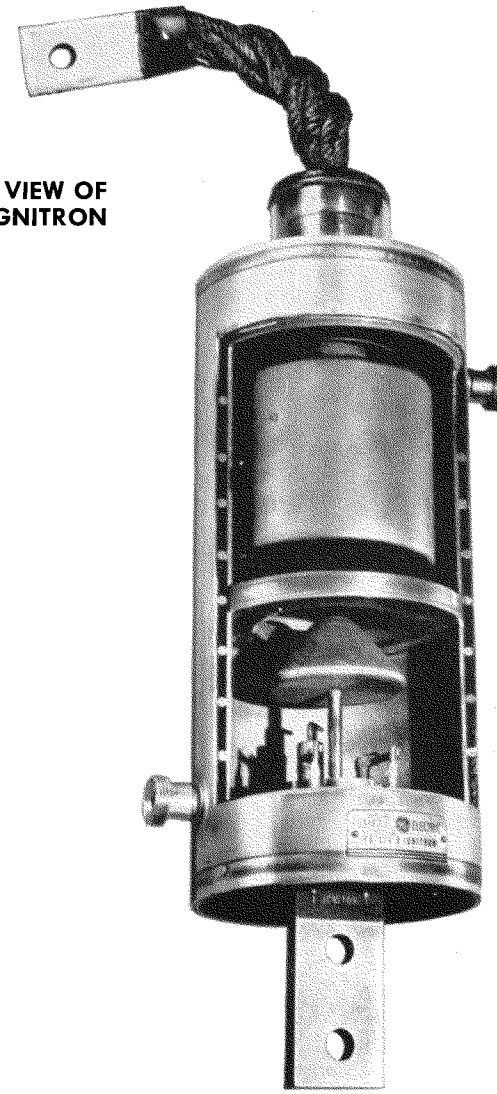
K-6917495 FIG. 4 8-25-44

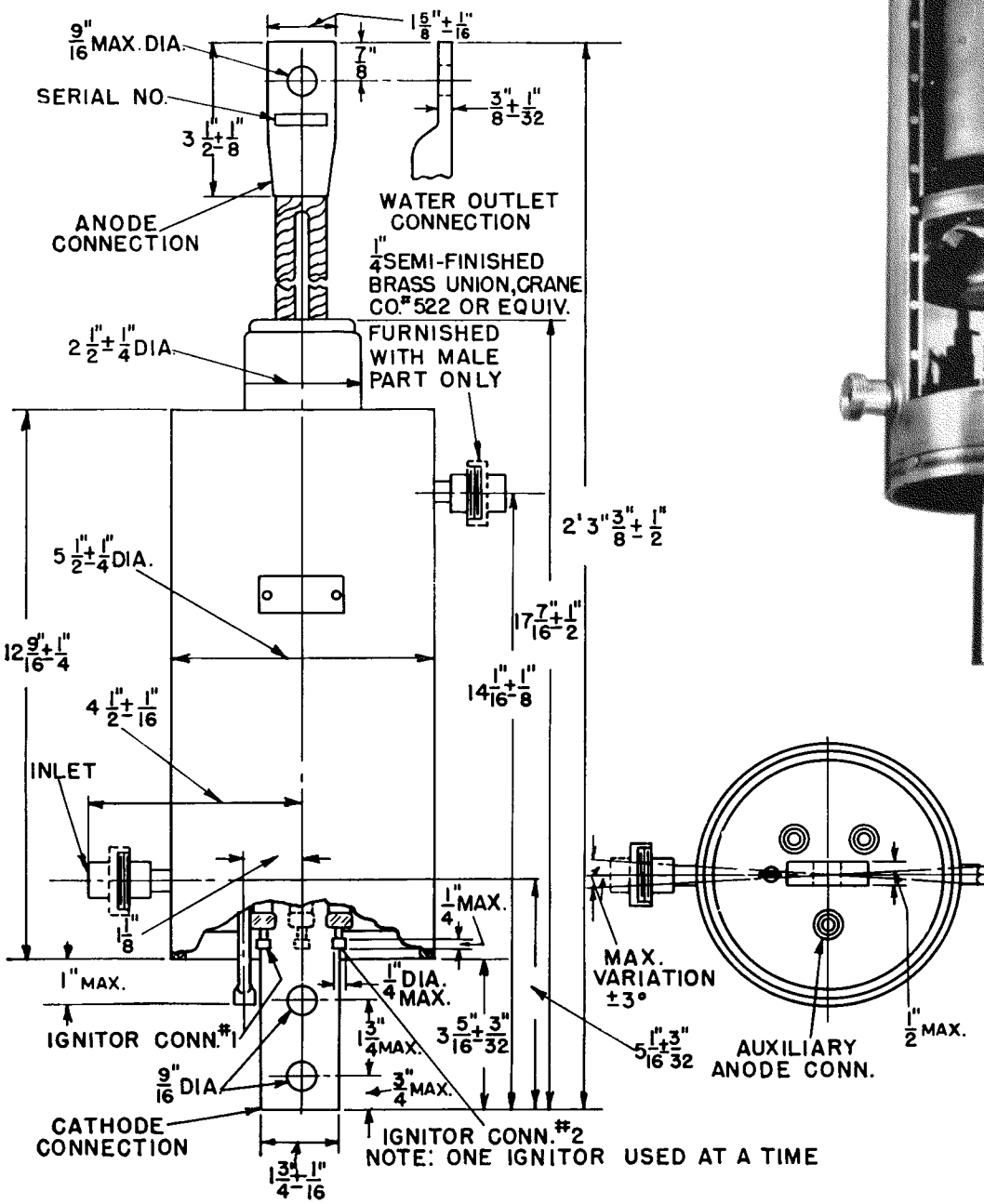


FG-238-B IGNITRON; DEMAND CURRENT VS PERCENTAGE DUTY AT 2400 VOLTS RMS, MAX. OUTLET WATER TEMP 30 C, MIN WATER RATE 3 GAL/MIN, WELDER CONTROL SERVICE

K-8074661 FIG. 5 9-26-44

CUT-AWAY VIEW OF
FG-238-B IGNITRON





K-5344658 OUTLINE FG-238-B IGNITRON 8-10-44

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Schenectady, N. Y.

4-45 (4M)
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