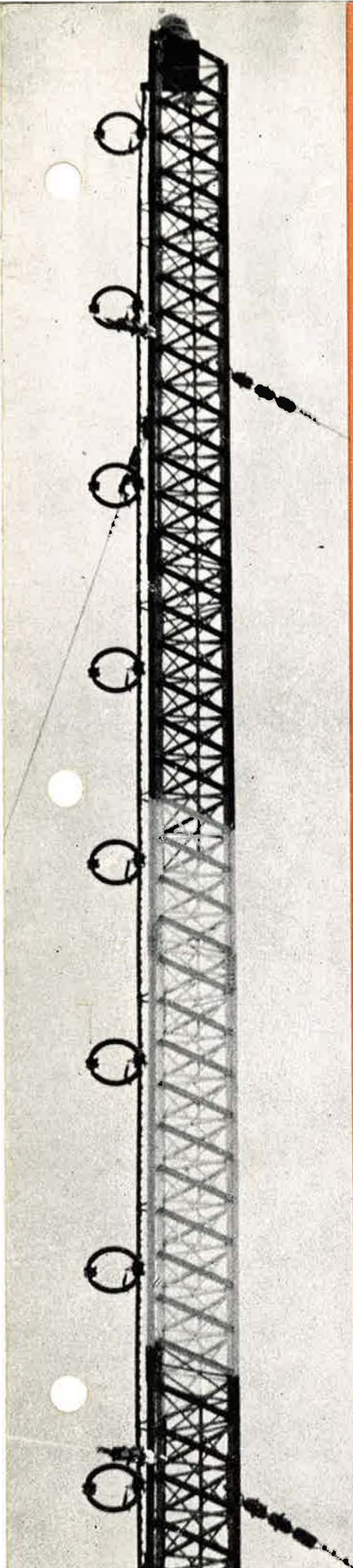
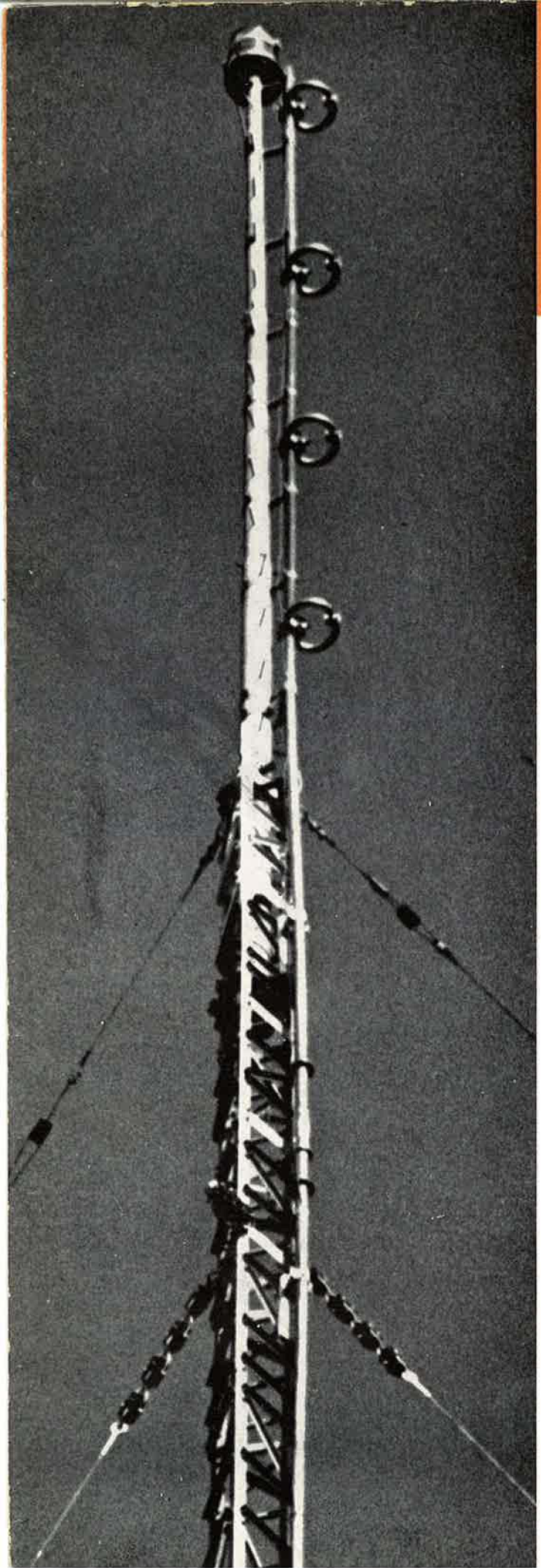


37M
ANTENNA

the COLLINS 37M FM Ring Antenna



STREAMLINED SIMPLICITY:

The Collins 37M Series Ring Antennas consist of only two basic parts: (1) radiating rings and (2) connecting inter-ring transmission line. Any number of rings, either odd or even, may be employed, providing maximum flexibility in available power gains for the requirements of the particular installation.

Only one inter-element transmission line is required to feed all rings in a multiple element array. The individual radiating rings are identical mechanically and electrically. They are both shunt fed and mechanically supported by this single interconnecting feed line, which consists of modified lengths of standard RMA specification rigid coaxial transmission line of suitable size for the transmitter power being employed. The 37M terminates in a standard RMA 51.5 ohm flange connection on the bottom element of the array for coupling directly to the transmission line.

LIGHT WEIGHT AND WINDLOADING:

Due to the simplicity of its electrical and mechanical design, the 37M is so light and compact that the resulting dead weight and windloads are reduced to a previously unknown low for FM antennas. The aerodynamic simplicity and low weight of the 37M are achieved through the complete elimination of massive radiating elements, complex external multiple line feed systems, bulky supporting structures, and unwieldly multiple element units in the individual radiating section. Greater efficiencies can be obtained and savings made in new tower costs, erection time and maintenance expense, by installing the 37M. For maximum power gains at low weight and windloads, the 37M is unexcelled.

METHOD OF MOUNTING:

Two advantageous methods of mounting the 37M Antenna are available to the FM broadcaster:

(1) Side mounting of the array on a corner leg of the tower offers definite advantages. Towers, either guyed or self-supporting, which previously have been considered incapable of supporting *any* FM antenna will in nearly all cases handle the Collins side mounting 37M. Towers which support top mounting television antenna arrays increase their usefulness with the addition of a Collins side mounting 37M array. Any number of rings may be side mounted, obviating the necessity of modifying the top of the tower or disturbing in any way the tower lighting equipment, top mounting TV radiator, or the tower proper.

(2) The top or pole mounting design is available on special

COLLINS FM RING ANTENNA outstanding in all features

order for installation on towers where no TV antenna is present or planned. This style of mounting provides the maximum in height and coverage.
The light weight and windloading of the top mounting array allow erection on most guyed and self-supporting towers without extensive tower modification.

INSTALLATION EASE:
The unique characteristics of light weight and electrical-mechanical simplicity make the 37M Antenna easy and quick to erect. There are no extraordinarily heavy hoisting problems, and many hours of erection time may be saved. Support brackets are specially fabricated for each installation to match the tower and mounting arrangement specified by the purchaser, thus minimizing erection problems at the site.

MECHANICAL STABILITY:
Another important advantage of the 37M is the inherent mechanical stability of the tower, transmission line, and antenna assembly. Undue oscillating and weaving of the tower and antenna are eliminated by the low weight and windload which result in reduced strain on the supporting structure as well as reduction in tower maintenance costs.

CIRCULAR RADIATION PATTERN:
The horizontal radiation pattern of the 37M is essentially circular for both top mounting and side mounting arrays. A maximum deviation of only 1 db is obtained in the top or pole mounted arrangement, while the circular pattern of the side mounted array will generally equal that of the top mounted antenna. The extent of deviation from a circular pattern in the side mounted antenna is normally minor and is dependent on the type and size of tower on which the antenna is mounted. Under the most unfavorable tower conditions the side mounted pattern has proved to be extremely good and entirely acceptable.

HIGH GAIN:
One of the most outstanding features of the new Collins FM Antennas is the availability of high power gains The flexibility of the number of rings, either odd or even, which may be used, provides a power gain to meet the requirements of each installation.

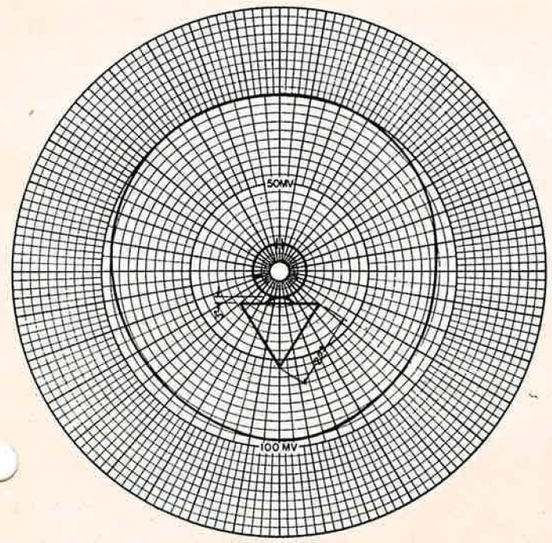
LOW VSWR:
The voltage standing wave ratio of the 37M can be maintained at better than 1.1 to 1 due to the inherently high stability of the tuning system. Adequate bandwidth virtually eliminates detuning effects caused by changes in atmospheric conditions.

AMPLE POWER CAPACITY:
Antenna arrays mounted on 1⅝" or 3⅛" line are available for handling transmitter powers up to 20 kw. There is a 37M to meet your particular power and gain requirements.

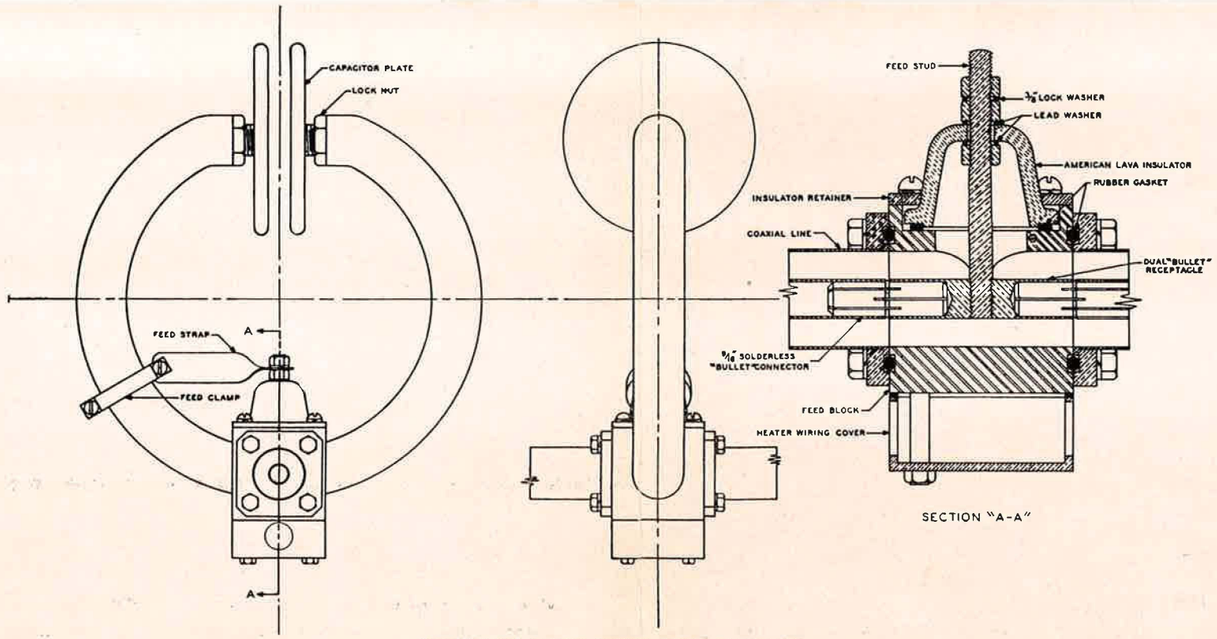
DE-ICING PROVISIONS:
The compactness and simplicity of the 37M Antenna allow the maximum efficiency in ice and sleet removal. Each ring may be equipped with an internally mounted heating unit which consists of a cartridge type element inside each of the tuning condenser plates and an additional flexible heating element extending the full circumference on the inside of the ring. The absence of large masses of metal makes de-icing of the 37M an efficient and practical operation while the operating costs of de-icers are reduced to an absolute minimum.

ECONOMY:
From every standpoint, the Collins 37M Series FM Antennas, whether top or side mounted, offer the FM broadcaster the ultimate in economical operation. Among the economies unique in the 37M are:

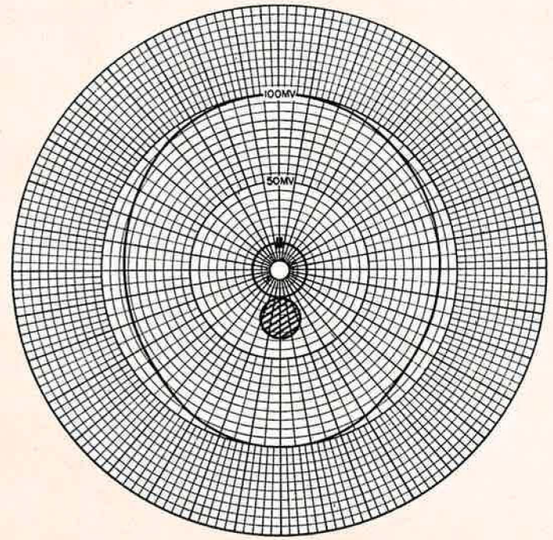
- Low initial cost.
- Highest gain at low weight and windloading
- Reduction in new tower costs
- Can be side mounted on light weight existing towers
- Lower erection costs
- Reduced maintenance expense



Typical Side Mounting radiation pattern 100 mc, 12" diameter ring on side of Wincharger tower.



FREQUENCY RANGE VERSUS LOOP DIAMETERS
Diameter varies from 11" to 14" depending upon frequency and line size.

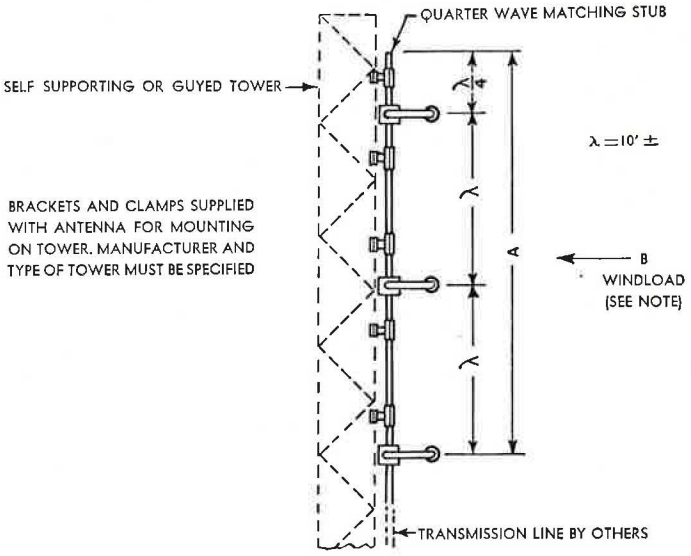


Typical Top Mounting radiation pattern 100 mc, 12" diameter ring on 10" diameter pole.

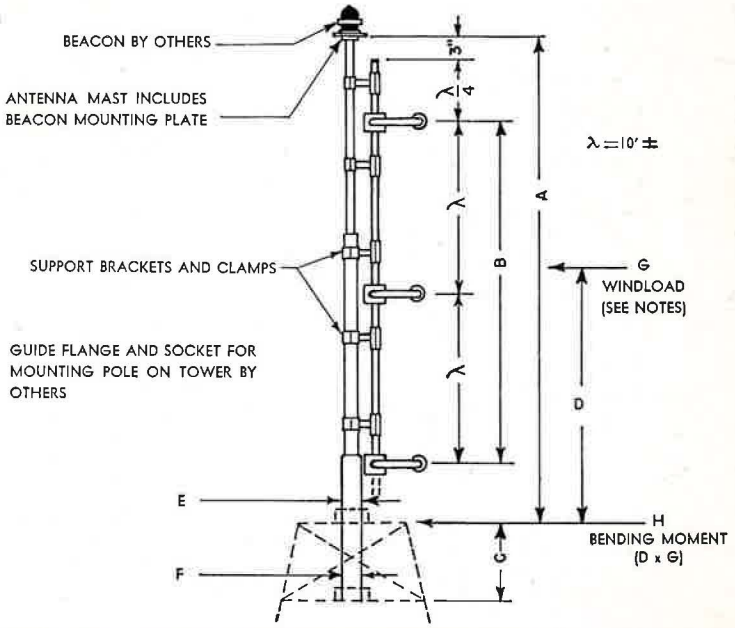
ENGINEERING DATA

COLLINS 37M SERIES FM ANTENNAS

SIDE MOUNTING



TOP MOUNTING



SIDE MOUNTING

Collins Type	No. of Rings	Power Gain	Field Gain	A Feet	On 1⅝" Line B	On 1⅝" Line Weight	On 3⅛" Line B	On 3⅛" Line Weight
37M-1	1	.9	.95	2-6±	24	23	32	46
37M-2	2	2.0	1.41	12-6±	68	55	100	100
37M-3	3	3.0	1.73	22-6±	114	86	170	175
37M-4	4	4.1	2.02	32-6±	160	119	240	240
37M-5	5	5.2	2.28	42-6±	206	152	310	305
37M-6	6	6.3	2.51	52-6±	252	185	380	370
37M-7	7	7.3	2.70	62-6±	298	218	450	435
37-M-8*	8	8.4	2.90	72-6±	344	251	520	500

TOP MOUNTING

Collins Type	No. of Rings	Pwr. Gain	A Ft.	B Ft.	C Ft.	On 1⅝" Line D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.	On 3⅛" Line D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.
37M-1	1	.9	6		3	4-7	3⅛"	3⅛"	50	230	223	4-7	3⅛"	3⅛"	68	312	250
37M-2	2	2.0	16	10±	4	10	4½"	4½"	239	2,390	305	12-3	4½"	4½"	291	3,565	360
37M-3	3	3.0	26	20±	7	14-5	6⅝"	6⅝"	403	5,803	736	14-4	6⅝"	6⅝"	486	6,950	825
37M-4	4	4.1	36	30±	10	19	7⅝"	7⅝"	564	10,716	1169	18-9	7⅝"	7⅝"	678	12,713	1290
37M-5	5	5.2	46	40±	12	23	8⅝"	7⅝"	747	17,181	1652	22-8	9⅝"	9⅝"	919	20,769	2128
37M-6	6	6.3	56	50±	14	27-2	9⅝"	8⅝"	951	25,867	2285	26-7	10¾"	9⅝"	1173	31,260	2770
37M-7	7	7.3	66	60±	15	31	10¾"	8⅝"	1175	36,425	3218	31-3	10¾"	8⅝"	1388	43,375	3485
37M-8*	8	8.4	76	70±	16-6	34-9	11¾"	9⅝"	1417	49,241	4051	34-8	12¾"	11¾"	1696	58,682	4650

* Antennas with more than 8 rings quoted upon request

1. Windloads based on 20 pounds per square foot on projected areas of cylindrical surfaces with all sections considered round.
2. Power gains compared to half wave dipole.
3. Antenna assemblies on 1⅝ inch line are rated for power inputs at base of antenna up to 3 kilowatts for a single ring array; 6 kilowatts for two or more rings.
4. Antenna assemblies on 3⅛ inch line are rated for power inputs up to 3 kilowatts per ring at base of antenna; with maximum of 20 kilowatts for seven or more rings.
5. Antennas for power inputs in excess of 20 kilowatts incorporate the use of a Tee feed at center of array.

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA

261 Madison Avenue	1930 Hi-Line Drive	2700 W. Olive Avenue	Dogwood Road, Fountain City	222 Pensacola Avenue
NEW YORK 16	DALLAS 2	BURBANK	KNOXVILLE	TALLAHASSEE

COLLINS RADIO COMPANY OF CANADA, LTD., 74 Sparks Street, OTTAWA, ONTARIO

2M-6-54-MP—Printed in U.S.A.

To: Reed

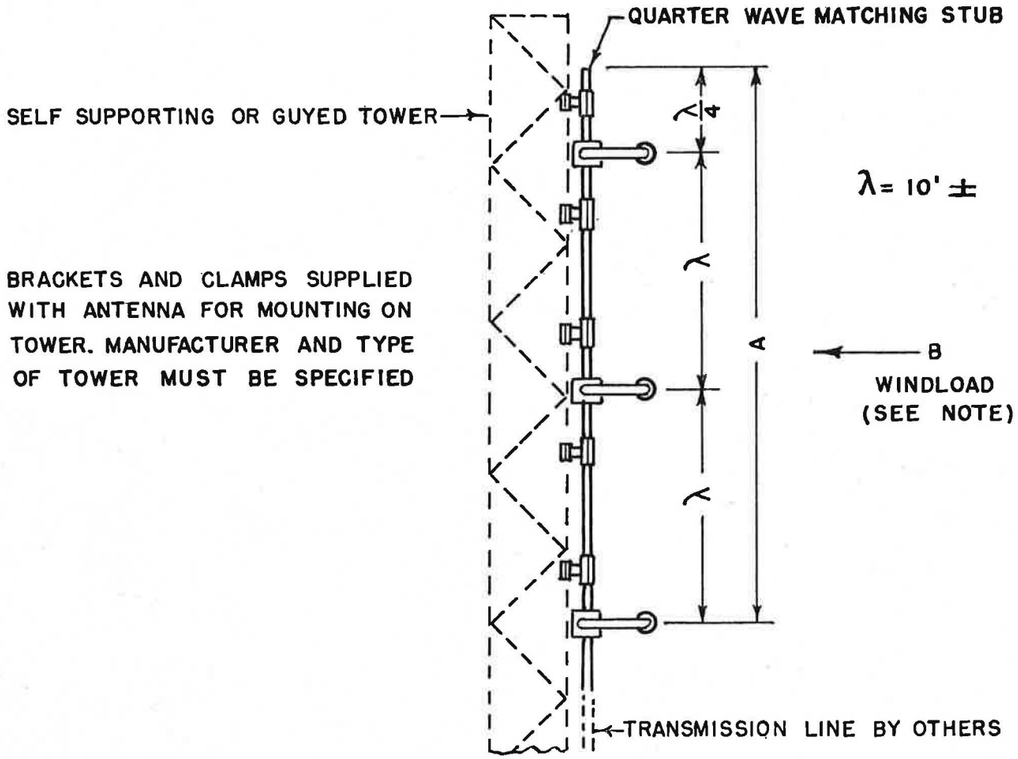
Announcing . . .

the New Collins 37M FM Ring Antenna

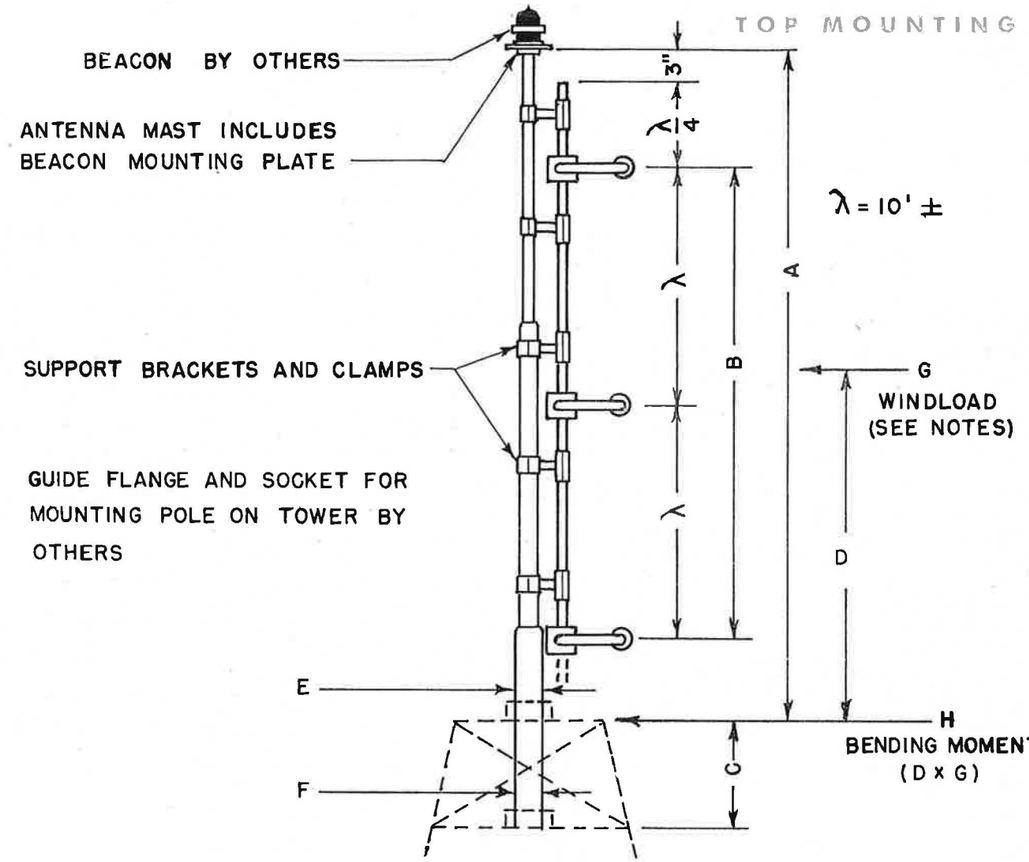
- ★ Mechanically streamlined
- ★ Electrically simplified
- ★ Lowest weight
- ★ Minimum windload
- ★ Easy to install
- ★ High gain
- ★ Wide tuning range
- ★ Horizontally polarized
- ★ Circular pattern
- ★ Mechanical stability
- ★ Ample power capacity
- ★ Maximum economy

ENGINEERING DATA — COLLINS 37M SERIES FM ANTENNAS

SIDE MOUNTING



TOP MOUNTING



Collins Type	No. of Rings	Power Gain	Field Gain	A Feet	On 1⅝" Line B	On 1⅝" Line Weight	On 3⅛" Line B	On 3⅛" Line Weight
37M-1	1	.9	.95	2–6 ±	24	23	32	46
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37M-3	3	3.0	1.73	22–6 ±	114	86	170	175
37M-4	4	4.1	2.02	32–6 ±	160	119	240	240
37M-5	5	5.1	2.26	42–6 ±	206	152	310	305
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37M-7	7	7.2	2.68	62–6 ±	298	218	450	435
37M-8	8	8.3	2.88	72–6 ±	344	251	520	500

Collins Type	No. of Rings	Pow Gain	A Ft.	B Ft.	C Ft.	On 1⅝" Line D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.	On 3⅛" Line D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.
37M-1	1	.9	6		3	4–7	3⅛"	3⅛"	50	230	223	4–7	3⅛"	3⅛"	68	312	250
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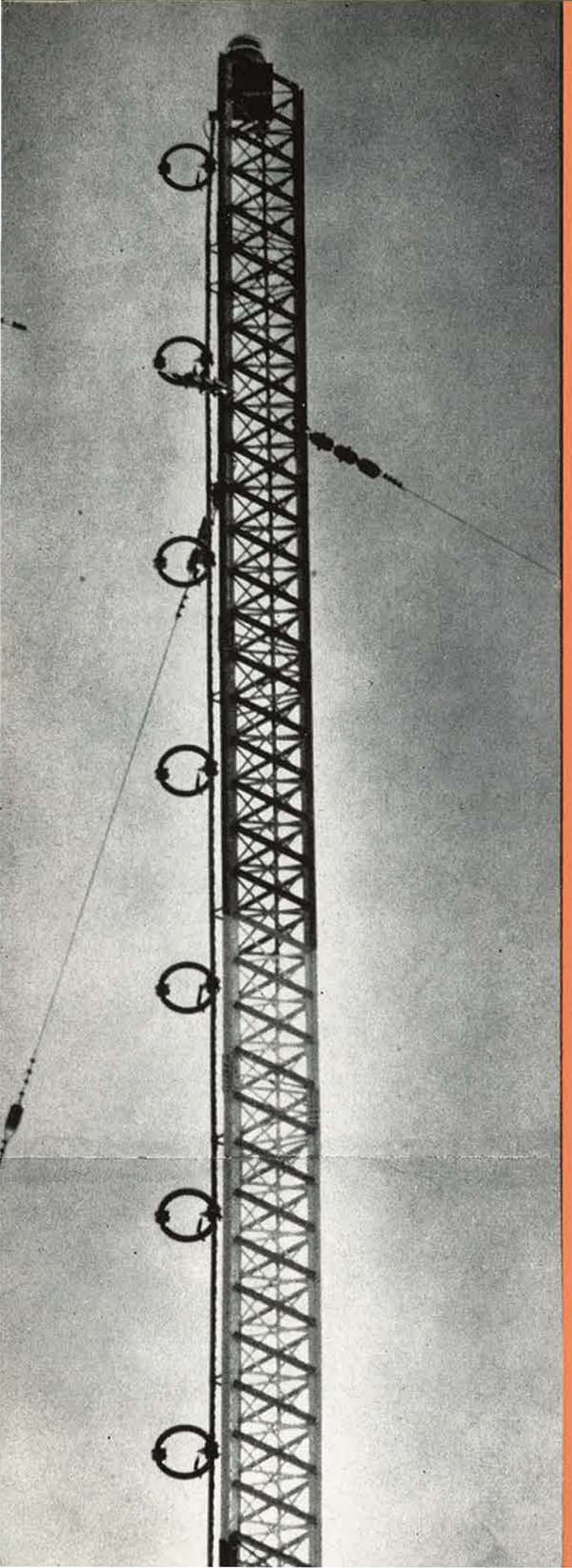
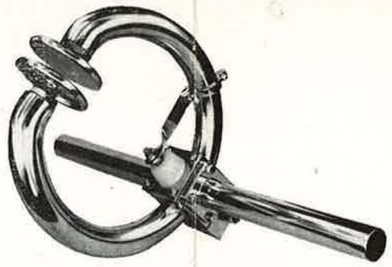
NOTES:
1. Windloads based on 20 pounds per square foot on projected areas of cylindrical surfaces with all sections considered round.
2. Power gains compared to half wave dipole.
3. Antenna assemblies on 1-5/8 inch line are rated for power inputs at base of antenna up to 6 kilowatts.
4. Antenna assemblies on 3-1/8 inch line rated for power inputs at base of antenna up to 27 kilowatts.
5. Antennae for power inputs at base of antenna in excess of 27 kilowatts incorporate 6-1/8 inch line beween radiating elements.





COLLINS FM RING ANTENNA
Outstanding in All Features

Streamlined Simplicity: The Collins 37M Series Ring Antennas consist of only three basic parts: (1) radiating rings, (2) connecting inter-ring transmission line, (3) supporting structure. Any number of rings, either odd or even, from one to eight may be employed, providing maximum flexibility in available power gains for the requirements of the particular installation.

Only one inter-element transmission line is required to feed all rings in a multiple element array. The individual radiating rings are identical mechanically and electrically. They are both shunt fed and mechanically supported by this single interconnecting feed line, which consists of modified lengths of standard RMA specification rigid coaxial transmission line of suitable size for the transmitter power being employed. The 37M terminates in a standard RMA 51.5 ohm flanged connection on the bottom element of the array for coupling directly to the transmission line.

Light Weight and Windloading: Due to the simplicity of its electrical and mechanical design, the 37M is so light and compact that the resulting dead weight and windloads are reduced to a previously unknown low for FM antennas. The aerodynamic simplicity and lower weight of the 37M are achieved through the complete elimination of massive radiating elements, complex external multiple line feed systems, bulky supporting structures, and unwieldy multiple element units in the individual radiating sections. Greater efficiencies can be obtained and savings made in new tower costs, erection time and maintenance expense, by installing the 37M. For maximum power gains at lowest weights and windloads the 37M is unexcelled.

Method of Mounting: Two equally advantageous methods of mounting the new 37M antenna are available to the FM broadcaster:

(1) The top or pole mounting design provides the maximum in height and coverage. The light weight and windloading of the top mounting array allow erection on most guyed and self-supporting towers without extensive tower modification. In new construction the tower costs and erection time can be considerably reduced by specifying the top mounting model 37M.

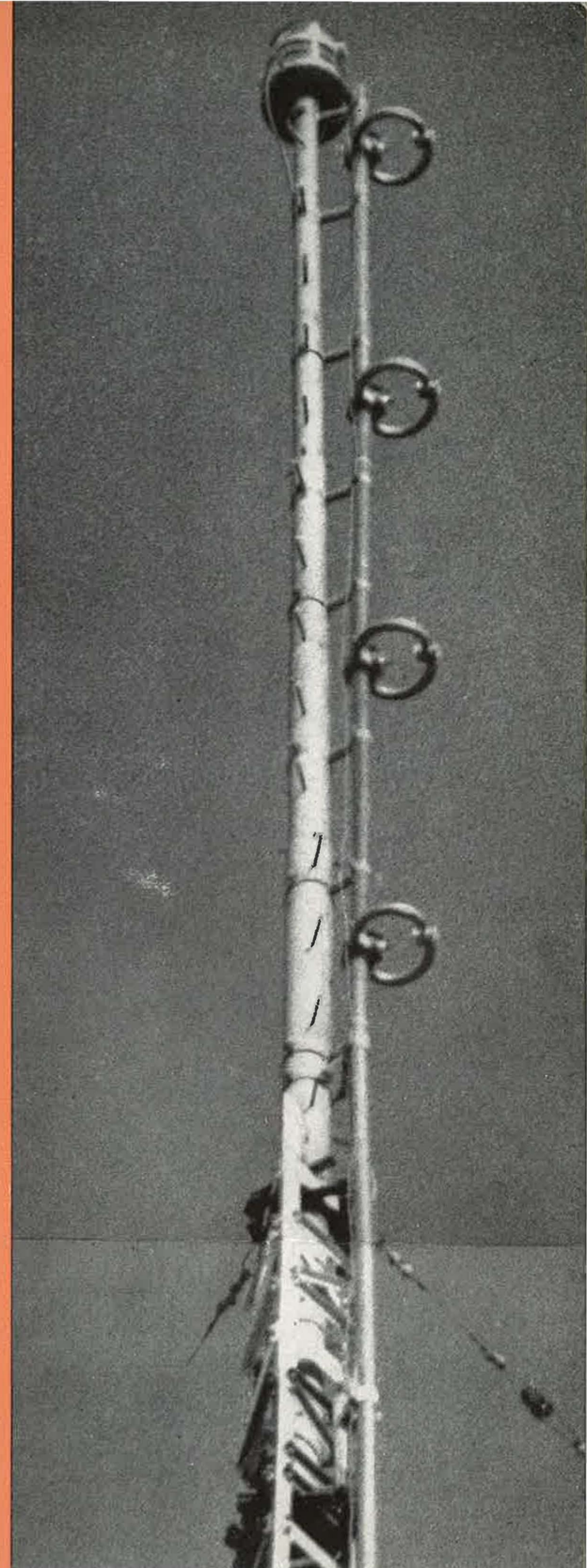
that the antenna could be installed so easily. We employed two men on the tower and two men on the ground, using a single pulley and hand line, pulled the eight sections to the top of the 410 ft. supporting structure and mounted them completely in approximately six hours working time. This is quite a record, I think." WPAD's experience is being duplicated in a large number of other installations throughout the country.

Mechanical Stability: Another important advantage of the 37M is the inherent mechanical stability of the tower, transmission line and antenna assembly. Undue oscillating and weaving of the tower and antenna are eliminated by the low weight and windload which result in reduced strain on the supporting structure as well as reduction in tower maintenance costs.

Circular Radiation Pattern: The horizontal radiation pattern of the 37M is essentially circular for both top mounting and side mounting arrays. A maximum deviation of only 1 db is obtained in the top or pole mounted arrangement, while the circular pattern of the side mounted array will generally equal that of the top mounted antenna. The extent of deviation from a circular pattern in the side mounted antenna is normally minor and is dependent on the type and size of tower on which the antenna is mounted. Under the most unfavorable tower conditions the side mounted pattern has proved to be extremely good and entirely acceptable.

High Gain: One of the most outstanding features of the new Collins FM antenna is the availability of high power gains. The flexibility of the number of rings, either odd or even, which may be used, provides a power gain to meet the requirements of each installation. Full wave length spacing between radiating rings provides power gains up to 8.3 for an 8-bay array, while proportionately lower gains are obtained with fewer radiating rings.

Wide Tuning Range: Three ring sizes are provided in the 37M series to insure maximum efficiency, stability and wide tuning range on the desired frequency of operation. It is possible to tune a range of 10 to 15 megacycles with any one size of ring. The voltage standing wave ratio of



(2) An entirely new concept, which is equally efficient, is the 37M side mounting array. Towers, either guyed or self-supporting, which previously have been considered incapable of supporting **any** FM antenna will in nearly all cases handle the Collins side mounting 37M. The same flexibility in available number of bays exists in the side mounting array. From one to eight rings may be side mounted, obviating the necessity of modifying the top of the tower or disturbing in any way the tower lighting equipment or the tower proper.

For interim operation it is entirely practicable to erect only a few bays of the 37M; at a later date additional rings may be erected without unduly disturbing the original installation.

Support for TV Antenna: For present or future television installations, the 37M top mounting antenna can be furnished with a slightly heavier supporting mast designed to accommodate the addition of a television mast and antenna above the FM array.

Installation Ease: The unique characteristics of light weight and electrical-mechanical simplicity make the 37M antenna easy and quick to erect. There are no extraordinarily heavy hoisting problems, and many hours of erection time may be saved.

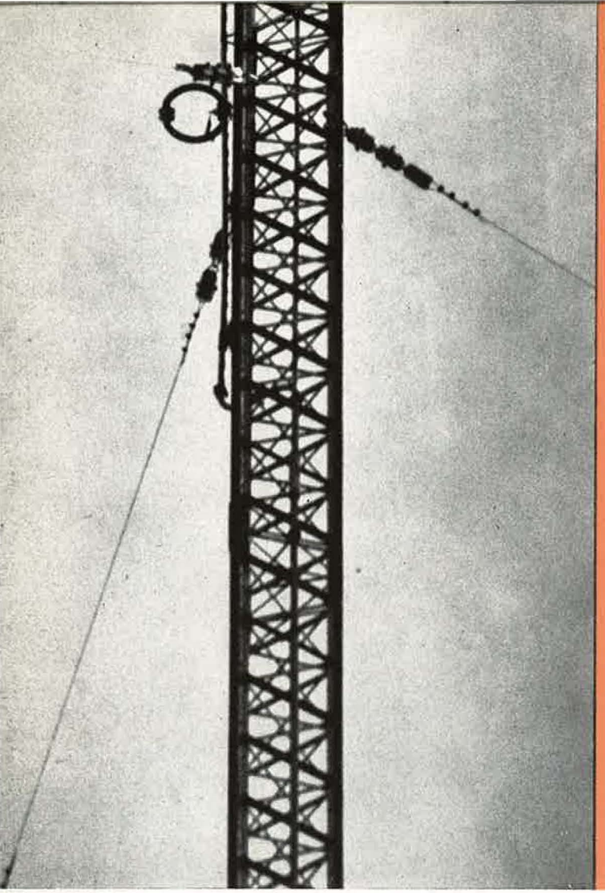
Mr. U. C. Morris, Chief Engineer of WPAD, Paducah, Kentucky, in a recent letter praising the performance of the new 37M-8 8-bay antenna, goes on to say: "Another thing which was of special benefit in our case was the fact bandwidth virtually eliminates detuning effects caused by changes in atmospheric conditions.

Ample Power Capacity: Antenna arrays mounted on 1⅝", 3⅛" or 6⅛" line are available for handling transmitter powers up to 50 kw. There is a 37M to meet your particular power and gain requirements.

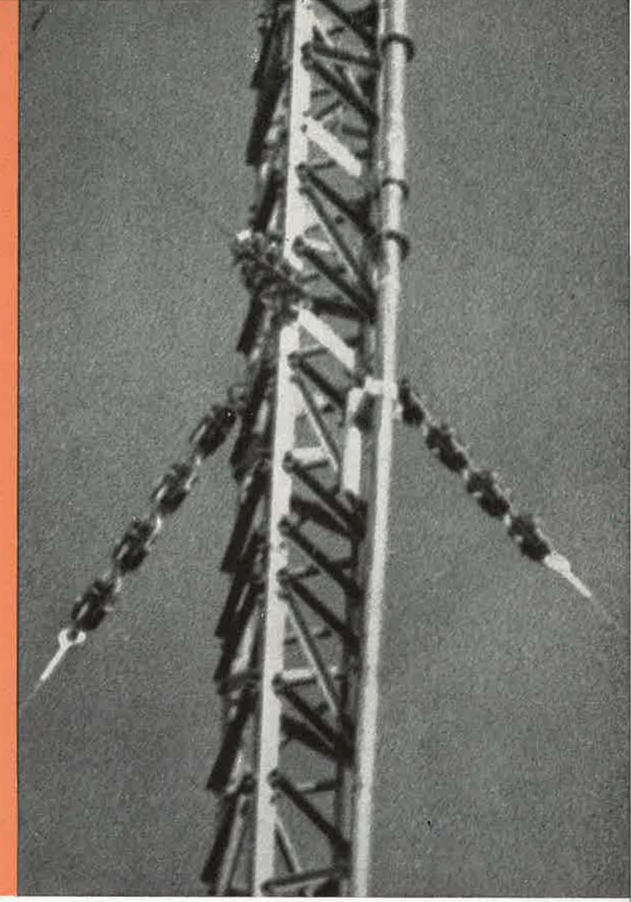
De-icing Provisions: The compactness and simplicity of the 37M antenna allow the maximum efficiency in ice and sleet removal. Each ring may be equipped with an internally mounted heating unit which consists of a cartridge type element inside each of the tuning condenser plates and an additional heating element extending the full circumference on the inside of the ring. The absence of large masses of metal makes de-icing of the 37M an efficient and practical operation while the operating costs of de-icers are reduced to an absolute minimum.

Economy: From every standpoint, the Collins 37M series FM antennas, whether top or side mounted, offer the FM broadcaster the ultimate in economical operation. Among the economies unique in the 37M are:

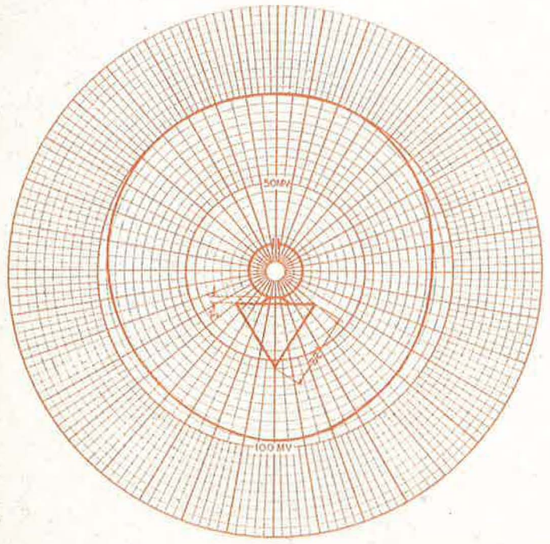
- ★ Low initial cost
- ★ Highest gain at lowest weight and windloading
- ★ Reduction in new tower costs
- ★ Can be side mounted on light weight existing towers
- ★ Lower erection costs
- ★ Reduced maintenance expense



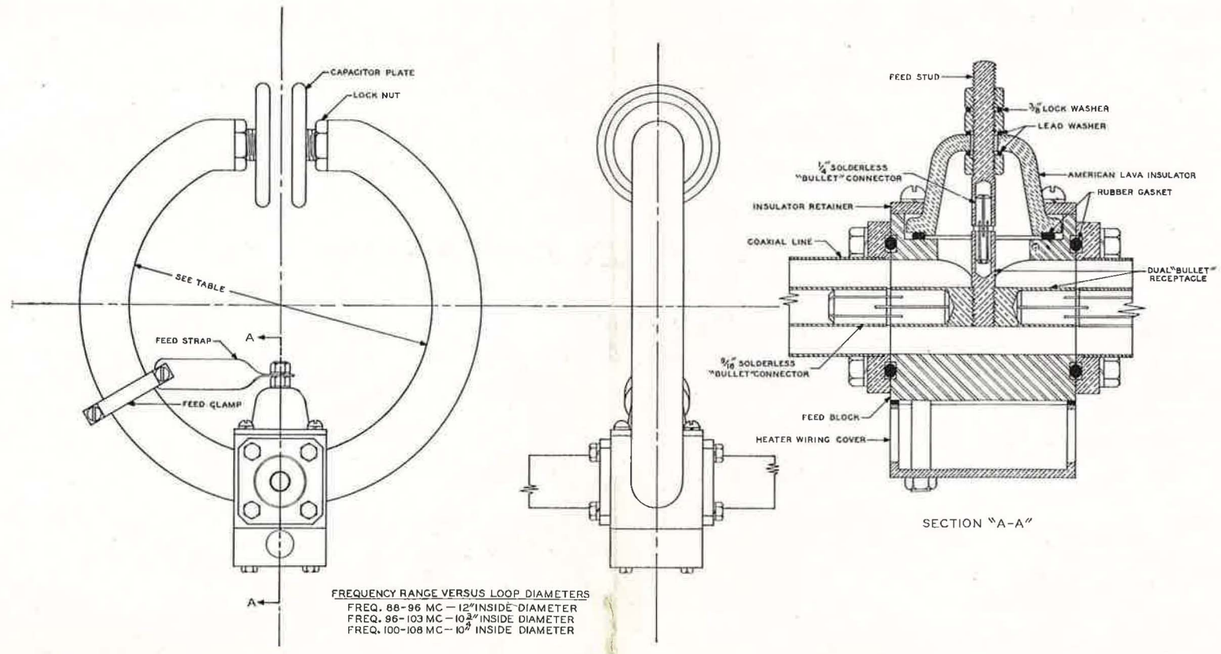
8-Bay Side Mounting ring antenna, WPAD, Paducah, Ky.



4-Bay Top Mounting ring antenna, WORD, Spartanburg, S. C.

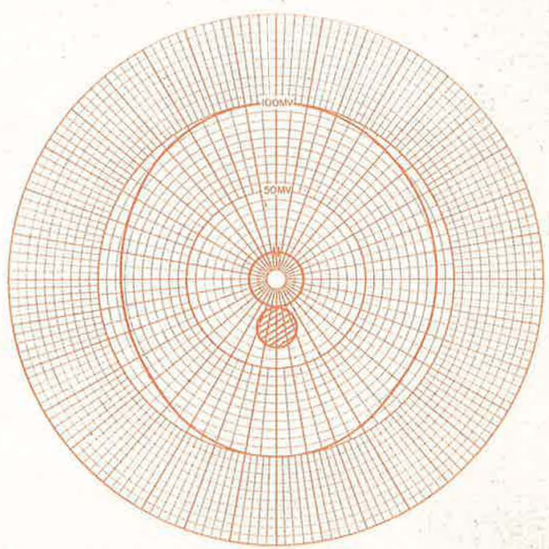


Typical Side Mounting radiation pattern 100 mc, 12" diameter ring on side of Wincharger tower



FREQUENCY RANGE VERSUS LOOP DIAMETERS
FREQ. 88-96 MC — 12" INSIDE DIAMETER
FREQ. 96-103 MC — 10⅜" INSIDE DIAMETER
FREQ. 100-108 MC — 10⅛" INSIDE DIAMETER

SECTION "A-A"



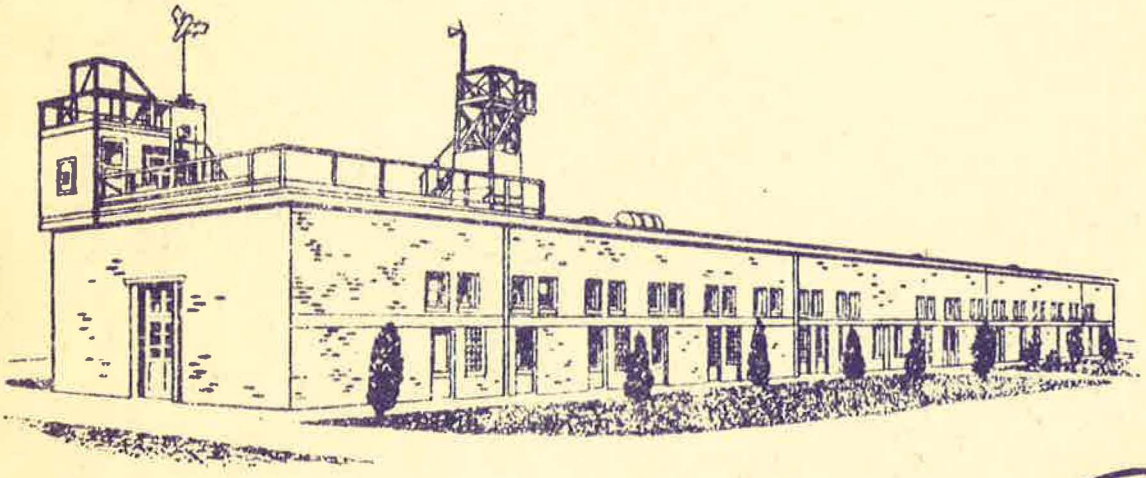
Typical Top Mounting radiation pattern 100 mc, 12" diameter ring on 10" diameter pole

COLLINS RADIO COMPANY
TYPE 37M FM ANTENNA

Installation Suggestions For

COLLINS RADIO COMPANY
TYPE 37M FM ANTENNA

Installation Suggestions For



ELECTRONICS RESEARCH, INC.

Evansville, Indiana

Your Collins 37M FM Antenna has been carefully assembled and pretuned to your station frequency before leaving the factory. Adjustments have been made to obtain the optimum VSWR reading at your assigned frequency. Tests have been conducted under pressure to insure that the system is free from gas leaks.

Observance of the simple suggestions contained in this manual should enable you to obtain a satisfactory installation of your antenna.

You will find that the insulator hold-down plate on each loop of the antenna has two numbers stamped into the metal. The insulator hold-down plate referred to is the brass plate measuring 3" square by 3/16" thick, which is bolted to the inside of each loop block, and through which the ceramic feed-through insulator protrudes. One number is stamped into the face of the hold-down plate on the upper side, and another number is stamped on the lower side. In mounting the antenna on your tower, the smaller number should always be on top, so that when the antenna has been completely assembled the numbers on the hold-down plates will read consecutively from the smallest number to the greatest number, beginning at the top of the antenna. If this procedure is followed, the feed straps of all the loops will be on the same side of the antenna.

Attention is called to the fact that numbers have also been stamped into the flanges on each section of the connecting coax line. As the antenna is assembled, the numbers on the coax flanges should be matched with the numbers stamped on the hold-down plates; (i.e., the No.0 line flange should be bolted to the loop block adjacent to the No.0 on the hold-down plate, etc.).

The sections of connecting coax supplied with your antenna are designed to space the loops one wavelength apart, which provides an antenna system with a power gain approximately equal to the number of loops employed. Mounting brackets supplied with your antenna are designed to provide two brackets to each section of coax line, and one bracket for the shorter quarter-wave section of line. It is suggested that whenever possible the mounting brackets be placed approximately 30 inches above and below each loop of the antenna. The holding bracket, which is the largest one, should be placed at the point which will provide the best possible support for the entire antenna assembly. Experience has shown that on assemblies of eight loops or less this heavy support bracket should normally be placed at the bottom; (i.e., just above the bottom loop of the assembly). On antennas of more than eight loops, having a center-feed section, it may be found advisable to locate this large support bracket

adjacent to the center-feed section to provide the best support. This is especially true if any appreciable length of feed coax has to be suspended from the center-feed point before it can be clamped to the tower.

The following points are important:

(1) *The spacing between the circular condenser plates on the loops and the location of the feeding clamps should not be altered, prior to final tuning, since these are critical factory adjustments. These spacings should be the same on all loops of the antenna. If it should appear that one or more of the feed clamps or plate spacings have been altered during shipment, it would be advisable to contact the factory before attempting to correct it.*

(2) *All loops should be mounted similarly on the supporting structure, with all feed straps on the same side and with the condenser plates as far as possible from the tower.*

(3) *Where deicers have been factory-installed, junction boxes are provided on the rear of each loop to accommodate a-c heater wiring and standard conduit. The deicers consist of a 100-watt, 60-volt element in each half of each loop. These elements are connected together in series in each loop before leaving the factory. After the antenna has been mounted on your tower it will be necessary to run conductor wire between the loops to provide 110-120 volt service. Open lead wires for making these connections will be revealed by removing the junction boxes on the back of each loop. The loops should be connected in parallel with your 110-120 volt service. After the connections have been made, care should be exercised to seal the junction boxes around the edges and at the conduit outlet to prevent moisture from entering. A small quantity of black sealing compound sufficient for this purpose is placed in each junction box before the antenna leaves the factory.*

(4) *To minimize the effects of moisture condensation, the feeding transmission line should be kept filled with*

dry gas at pressure of about five pounds. The quarter-wave section at the top of the antenna may be loosened temporarily to facilitate the draining of residual air from the transmission line.

(5) Occasionally, during shipment and handling, the nuts on the feeding studs may be shaken loose, causing an air leak at the center hole of the insulator bowls on the loops. After an installation is completed, these nuts should be checked and may be tightened gently, if necessary, care being taken to avoid damage to the sealing lead washers or the feed-through insulators.

(6) Before the antenna and associated transmission line are put into service, tests should be made to insure that the over-all system is operating properly. This is extremely important to detect any errors which may have been made in installing the transmission line, or any detuning which may have been caused by the supporting structure or mechanical damage. A vswr of better than 1.5/1 at the operating frequency is to be expected. A mechanical defect in the transmission line or antenna is usually indicated by a vswr of worse than 3/1. If vswr's in the range of 3/1 to 1.5/1 occur, it is probable that the loops are slightly off resonance. The spacings between the condenser plates on all loops should be checked, at the centers, to insure that they are all the same. Then all plates should be turned in or out simultaneously, in steps of approximately a quarter turn, until a vswr of less than 1.5/1 is obtained at the operating frequency. This method of retuning the antenna is usually satisfactory only when the total change in plate spacing is less than about two turns. If it is necessary to make radical changes in antenna tuning, the manufacturer or an engineer thoroughly familiar with high-frequency techniques should be consulted.

It should be noted that where deicers are installed in the 37M

antenna they are designed to compensate for severe icing conditions. It is sometimes advantageous, therefore, to provide some means, such as a tapped transformer, for normally operating the heater elements at reduced voltages. Approximately 60 to 75 volts is usually adequate except in severe conditions.

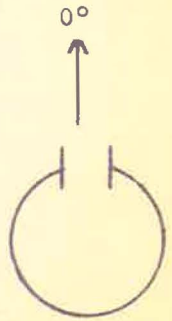
All parts of the antenna, except the circular capacitor plates and the insulator bowls, may be painted periodically to prevent oxidation; however, the antenna loops should not be painted until after final tuning on your tower is complete.

NOTE: Features of the 37M Antenna are covered by United States Patents Nos.2,467,961 and 2,467,962.

TABLE I - GAIN AND PATTERN DATA

No. of Loops	Power Gain*	Field Gain*	Field, (Mv/M/KW @ One Mile) Va. Rotation					
			0°	45°/315°	90°/270°	135°/225°	180°	Average
1	0.9	0.95	146	133	119	130	137	131
2	2.0	1.41	217	197	176	193	203	194
3	3.0	1.73	266	242	216	237	249	238
4	4.1	2.02	311	283	252	277	291	278
5	5.2	2.26	348	316	282	310	326	311
6	6.3	2.51	386	351	313	344	361	345
7	7.3	2.70	416	378	338	370	388	372
8	8.4	2.90	446	406	362	397	417	399
10	10.5	3.24	499	454	405	444	466	445
12	12.7	3.56	548	498	445	488	512	490
14	14.8	3.85	593	539	481	528	554	530
16	17.0	4.13	636	578	516	566	595	569

*Gain over a dipole antenna having a radiation of 137.6 Mv/M/KW @ One Mile.



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