Radiators

AMERICAN RADIATORS

(TRADE-MARK.)

A Foreword.

IN presenting this Pocket Catalogue, which supersedes all prior catalogues, we beg respectfully to call attention to the excellence of design, high efficiency, superior quality and unrivaled assortment of our Radiators. The various types shown have been perfected during an experience covering a period of more than a quarter century exclusively devoted to the manufacture of radiators, and represent the ripest ideas and the best efforts in radiator construction, incorporating most perfectly every improvement in design and manufacture.

Ripest id

To attain that degree of excellence which has made "AMERICAN RADIATORS" the recognized and acknowledged standard in the United States, and which has also secured for them a constantly growing market, it has been necessary to go through all the various and costly stages of experiment and invention, but having successfully solved the problems which were from time to time presented in the development of our several plants—the largest and best in the world, covering an area of twenty acres and filled with the most advanced machinery and equipment—it is possible for us to furnish a product that is positively unequaled in design, thoroughness of construction and excellence of material.

Quality o first.

Each style of radiator presented is constructed upon the elementary features of efficiency and compactness, economy and cleanliness, convenience and reliability, gracefulness and artistic ornamentation, and with a view to its complete adaptability to the special requirements of the building to be heated and the most convenient and available location therein for the radiators.

Elementar features.

We would emphasize the fact that the loops of "AMERICAN RADIATORS" contain the full area of heating surface claimed. The internal areas of the sections and connections afford

Perfect circulation.

unobstructed and large openings for the passage of steam and water, securing perfect circulation, while the joints are absolutely tight and permanent.

Critics endorse.

The fact that our Radiators are used in a constantly increasing majority of the modern palatial office and public buildings, and the better class of residences in this country, inviting the most critical attention of the best heating engineers to every feature of their construction, is the highest possible endorsement of the excellence and superiority of our goods, and eloquently testifies to the splendid results afforded by them.

Quick service.

Immense stocks of radiators are regularly carried at our different factories, also at our Branches and warehouses, located at so many of the principal business centers, affording direct connection with every important transportation line in America, and with the highways of the world. We are therefore enabled to serve our customers at all times of the year with exceptional promptness and despatch, as well as to offer them many direct and incidental advantages, made possible by our long experience and unequaled facilities.

We shall constantly strive to merit the continued confidence of the trade by our strict adherence to a policy always broad and enterprising, and respectfully ask that our claims for the superiority of "AMERICAN RADIATORS" shall receive your careful consideration.

Respectfully,

AMERICAN RADIATOR COMPANY

January, 1897.

ALL RADIATORS

Illustrated on pages 5 to 56, inclusive, are manufactured at our

DETROIT PLANT,

Detroit, Mich.

The "Verona" Radiator.

THERE is a boundary to every field of manufacture beyond which further gain in quality and beauty can be secured only at a cost out of all proportion to the practical results obtained. This is true of the "Verona" Radiator, for in its manufacture the line is not drawn at quality limit, but the seeking ever is for infinite perfection in every detail of the processes involved.

It is difficult, by picture or description, to convey an adequate idea of the beauty of design, exquisite modelling, and perfect workmanship embodied in the "Verona" Radiators. The full beauty of the casting can be appreciated only by viewing the article itself.

It represents the ripest ideas and the best efforts in radiator construction, incorporating most perfectly every improvement in design and manufacture. For beauty, richness and delicacy of ornamentation, elegance of proportion, finished smoothness of castings, appealing sense of lightness and gracefulness, the "Verona" is simply incomparable — it is a work of art in iron.

Verona Leg Section.

(Patented November 3, 1896.)

See pages 6 and 11.

Verona Radiator.

(Patented November 3, 1896.)

See pages 6 and 11.

Verona Direct Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2¼ inches per Sec.	HEATING SURFACE—SQUARE FEET.			
		38-in. Height. 4 Sq. Ft. per Sec.	32-in. Height. 3⅓ Sq. Ft. per Sec.	26-in. Height. 2⅔ Sq. Ft. per Sec.	20-in. Height. 2 Sq. Ft. per Sec.
2	5	8	6⅔	5⅓	4
3	7½	12	10	8	6
4	10	16	13⅓	10⅔	8
5	12½	20	16⅔	13⅓	10
6	15	24	20	16	12
7	17½	28	23⅓	18⅔	14
8	20	32	26⅔	21⅓	16
9	22½	36	30	24	18
10	25	40	33⅓	26⅔	20
11	27½	44	36⅔	29⅓	22
12	30	48	40	32	24
13	32½	52	43⅓	34⅔	26
14	35	56	46⅔	37⅓	28
15	37½	60	50	40	30
16	40	64	53⅓	42⅔	32
17	42½	68	56⅔	45⅓	34
18	45	72	60	48	36
19	47½	76	63⅓	50⅔	38
20	50	80	66⅔	53⅓	40
21	52½	84	70	56	42
22	55	88	73⅓	58⅔	44
23	57½	92	76⅔	61⅓	46
24	60	96	80	64	48
25	62½	100	83⅓	66⅔	50
26	65	104	86⅔	69⅓	52
27	67½	108	90	72	54
28	70	112	93⅓	74⅔	56
29	72½	116	96⅔	77⅓	58
30	75	120	100	80	60
31	77½	124	103⅓	82⅔	62
32	80	128	106⅔	85⅓	64

The Verona Radiator is tapped 2 inches, and unless otherwise ordered will be bushed in accordance with list on page 50. For list of *special tappings*, see page 52.

Each section is 8 inches wide. Width of legs, 8½ inches.

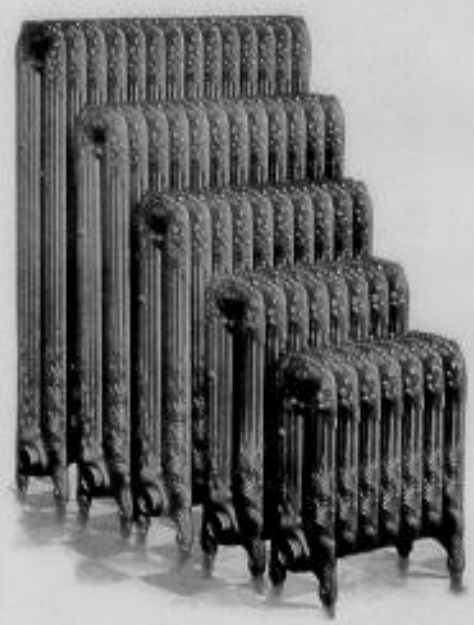
All openings will have right-hand threads, unless otherwise ordered.

Connected with right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.

Top of each Verona Hot Water leg section has 1½ inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

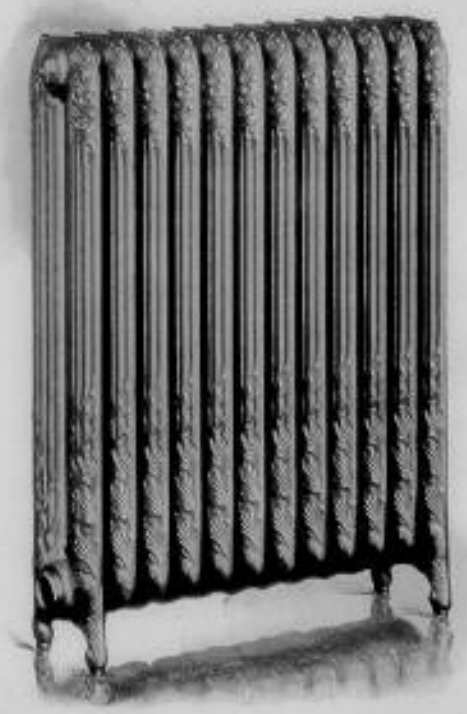
*In estimating *length* of Radiator, allow ½ *inch* for each bushing.



Detroit Ornamental Fluted Direct Steam Radiators.
45, 38, 31, 25 and 20 in. Heights.
See page 15.

AMERICAN RADIATORS

Detroit Ornamental Fluted Direct Steam Radiator.
See page 15.



Detroit Ornamental Fluted Direct Hot Water Radiator.

See page 15.

Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Direct Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length, 2⅛ in. per Sec.	HEATING SURFACE—SQUARE FEET.				
		45-in. Height. 5¼ Sq. Ft. per Sec.	38-in. Height. 4½ Sq. Ft. per Sec.	32-in. Height. 3⅝ Sq. Ft. per Sec.	25-in. Height. 2⅞ Sq. Ft. per Sec.	20-in. Height. 2¼ Sq. Ft. per Sec.
2	4¼	10½	8½	7	5½	4½
3	6⅜	15¾	13	10½	8¼	6¾
4	9¼	21	17½	14	11	9
5	11⅝	26¼	21⅝	17½	13¾	11¼
6	13⅞	31½	26	21	16½	13½
7	16⅛	36¾	30⅓	24½	19¼	15¾
8	18⅜	42	34⅝	28	22	18
9	20⅝	47¼	39	31½	24¾	20¼
10	23⅛	52½	43⅓	35	27½	22½
11	25⅜	57¾	47⅝	38½	30¼	24¾
12	27¾	63	52	42	33	27
13	30⅛	68¼	56⅓	45½	35¾	29¼
14	32⅜	73½	60⅔	49	38½	31½
15	34⅝	78¾	65	52½	41¼	33¾
16	37	84	69⅓	56	44	36
17	39⅜	89¼	73⅔	59½	46¾	38¼
18	41⅝	94½	78	63	49½	40½
19	43⅞	99¾	82⅓	66½	52¼	42¾
20	46¼	105	86⅔	70	55	45
21	48⅝	110¼	91	73½	57¾	47¼
22	50⅝	115½	95⅓	77	60½	49½
23	53⅛	120¾	99⅔	80½	63¼	51¾
24	55½	126	104	84	66	54
25	57⅞	131¼	108⅓	87½	68¾	56¼
26	60⅛	136½	112⅔	91	71½	58½
27	62⅜	141¾	117	94½	74¼	60¾
28	64¾	147	121⅓	98	77	63
29	67⅛	152¼	125⅔	101½	79¼	65¼
30	69⅜	157½	130	105	82½	67½
31	71⅝	162¾	134⅓	108½	85¼	69¼
32	74	168	138⅔	112	88	72

Unless otherwise ordered, these Radiators will be tapped 2 inches and bushed according to list on page 30. For list of *special tappings*, see page 52.

Each section is 8 inches wide. Width of legs, 8½ inches.

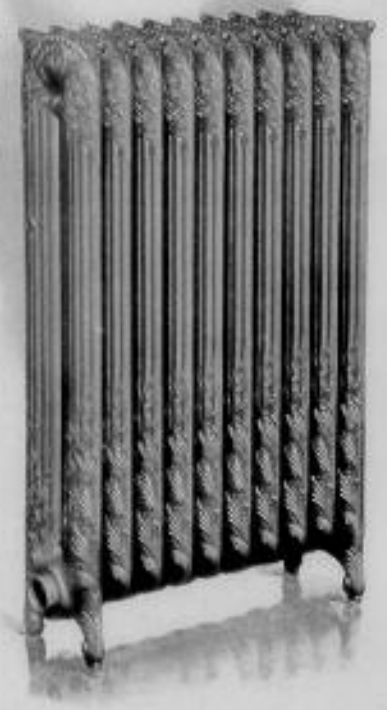
All openings will have right-hand threads, unless otherwise ordered.

Connected with extra heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1¼ inches at top, 2 inches at bottom.

Top of each Hot Water leg section has 1¼ inch plug, which can be taken out to make top connection when desired.

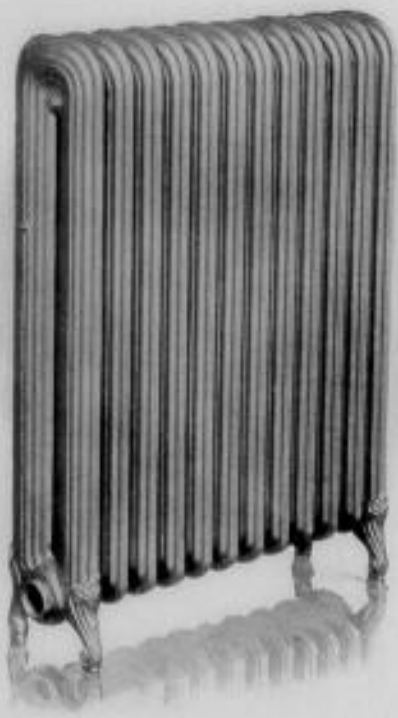
Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.



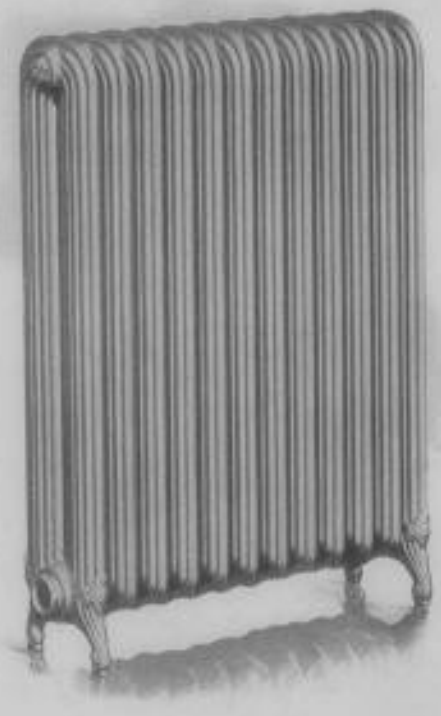
Detroit Ornamental Fluted Wide Top Direct Steam Radiator.

Made for Steam and Hot Water, on special order only, in all heights and of dimensions given on page 15.



Detroit Plain Fluted Direct Steam Radiator.

See page 15.

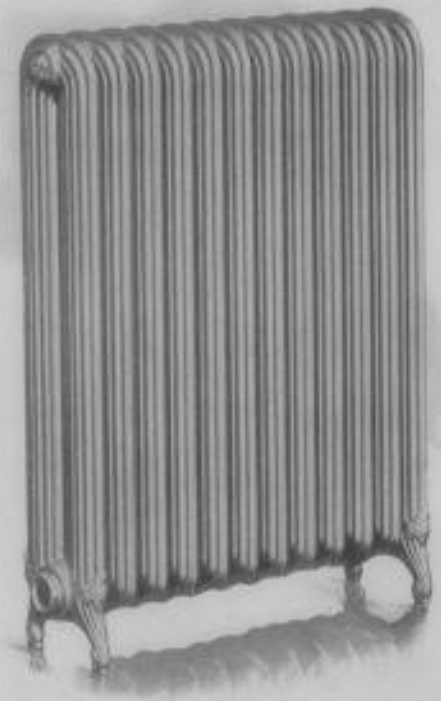


Detroit Plain Fluted Direct Hot Water Radiator.

See page 15.

Rococo Direct Steam Radiator.

See page 21.



Detroit Plain Fluted Direct Hot Water Radiator.

See page 15.

Rococo Direct Steam Radiator.

See page 21.

Rococo Direct Hot Water Radiator.

See page 21.

Rococo Direct Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length, 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET.					
		44-in. Height. 6 Sq. Ft. per Sec.	38-in. Height. 5 Sq. Ft. per Sec.	32-in. Height. 4½ Sq. Ft. per Sec.	26-in. Height. 3½ Sq. Ft. per Sec.	22-in. Height. 3 Sq. Ft. per Sec.	18-in. Height. 2½ Sq. Ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Unless otherwise ordered, Rococo Radiators are tapped 2 inches, and bushed according to list on page 30. For list of *special tappings*, see page 56.

Each section is 10 inches wide. Width of legs, 10¼ inches.

All openings will have right-hand threads, unless otherwise ordered.

All Rococo Radiators made at DETROIT PLANT are connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 2 inches at top and bottom. (See Note below.)

Top of each Hot Water leg section has 2 inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, supply 4½ inches, return 4 inches; Hot Water, supply and return, 4½ inches.

NOTE.—For Rococo Hot Water Radiators connected with slip nipples, see pages 72 and 73.

*In estimating *length* of Radiator, *allow* ½ *inch* for each bushing.

Italian Flue Steam Radiator.

(Patented October 20, 1896.)

See page 23.

Italian Flue Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2 inches per Sec.	HEATING SURFACE — SQUARE FEET.			
		38-in. Height. 7 Sq. Ft. per Sec.	32-in. Height. 5½ Sq. Ft. per Sec.	26-in. Height. 4½ Sq. Ft. per Sec.	20-in. Height. 3½ Sq. Ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Unless otherwise ordered, the Italian Flue Radiators are tapped 2 inches, and bushed according to list on page 50. For list of *special tappings*, see page 52.

Each section is 8½ inches wide.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.

Top of each Italian Flue Hot Water leg section has 1½-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of supply tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, 4½ inches supply and return.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Italian Flue Steam Radiator.

(Patented October 20, 1896.)

See page 23.

Italian Flue Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2 inches per Sec.	HEATING SURFACE—SQUARE FEET.			
		38-in. Height, 7 Sq. Ft. per Sec.	32-in. Height, 5½ Sq. Ft. per Sec.	26-in. Height, 4½ Sq. Ft. per Sec.	20 in. Height, 3½ Sq. Ft. per Sec.
2	6	14	11	9	6½
3	9	21	17½	13½	9¾
4	12	28	23	18	13
5	15	35	28½	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Unless otherwise ordered, the Italian Flue Radiators are tapped 2 inches, and bushed according to list on page 50. For list of *special tappings*, see page 52.

Each section is 8½ inches wide.

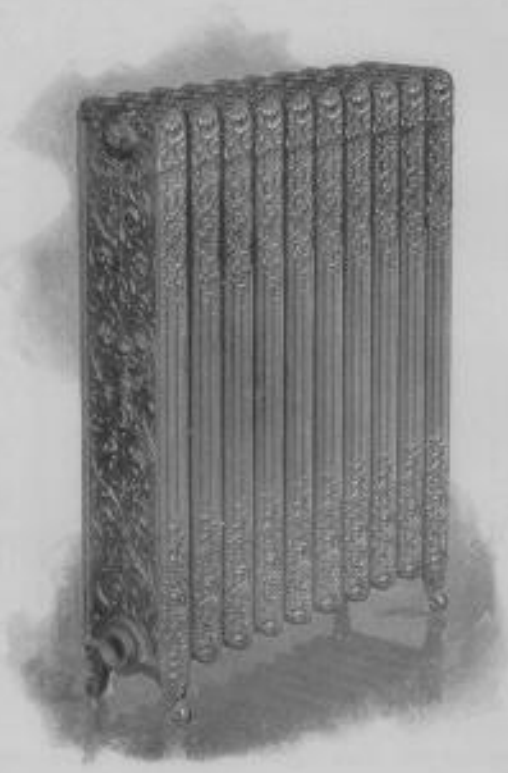
All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.

Top of each Italian Flue Hot Water leg section has 1½-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of supply tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, 4½ inches supply and return.

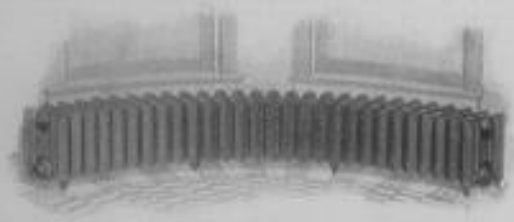
*In estimating *length* of Radiator, *allow ½ inch* for each bushing.



Italian Flue Hot Water Radiator.

(Patented October 20, 1896.)

See page 23.



Detroit Flue Steam or Hot Water Curved Radiator.

See pages 26 and 41.

Detroit Flue Steam or Hot Water Radiator.

See page 26.

Specially designed for use under windows, affording a maximum of heating surface in a minimum of space.

Detroit Flue Steam or Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length, 3 inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		20-in. Height. 6 Sq. Ft. per Sec.	18-in. Height. 5⅓ Sq. Ft. per Sec.	16-in. Height. 4⅔ Sq. Ft. per Sec.	14-in. Height. 4 Sq. Ft. per Sec.	13-in. Height. 3⅔ Sq. Ft. per Sec.
2	6	12	10⅔	9⅓	8	7⅓
3	9	18	16	14	12	11
4	12	24	21⅓	18⅔	16	14⅔
5	15	30	26⅔	23⅓	20	18⅓
6	18	36	32	28	24	22
7	21	42	37⅓	32⅔	28	25⅔
8	24	48	42⅔	37⅓	32	29⅓
9	27	54	48	42	36	33
10	30	60	53⅓	46⅔	40	36⅔
11	33	66	58⅔	51⅓	44	40⅓
12	36	72	64	56	48	44
13	39	78	69⅓	60⅔	52	47⅔
14	42	84	74⅔	65⅓	56	51⅓
15	45	90	80	70	60	55
16	48	96	85⅓	74⅔	64	58⅔
17	51	102	90⅔	79⅓	68	62⅓
18	54	108	96	84	72	66
19	57	114	101⅓	88⅔	76	69⅔
20	60	120	106⅔	93⅓	80	73⅓
21	63	126	112	98	84	77
22	66	132	117⅓	102⅔	88	80⅔
23	69	138	122⅔	107⅓	92	84⅓
24	72	144	128	112	96	88
25	75	150	133⅓	116⅔	100	91⅔

Unless otherwise ordered, the Detroit Flue Radiator is tapped 2 inches, and bushed according to list on page 50. For list of *special tapping's*, see page 52.

Each section is 12½ inches wide.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples, 2 inches at bottom, 1½ inches at top.

Top of each leg section has 1½-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of tapping: single pipe Steam, 2½ inches; double pipe Steam, 3 inches supply, 2½ inches return; Hot Water, supply and return, 3 inches.

*In estimating *length* of Radiator, *allow ¼ each* for each bushing.

Direct-Indirect Radiators

Are made at DETROIT PLANT in 45, 38, 31, 25 and 20 in. Heights of Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, for Steam and Hot Water; also in 44, 38, 32, 26, 22 and 18 in. Heights of Rococo, for Steam and Hot Water.

(See, also, Italian Flue Box Base Radiators, for Direct-Indirect heating, shown on pages 30 to 35, inclusive.)

The lower portion of each section or loop of the radiator has flanges cast on each side, and, when the sections are connected, the flanges dove-tail together and form large, perpendicular, fresh-air flues between the sections. A damper door is placed at either end of base, and if desired, when cold air supply is shut off by means of a register in air duct, the radiator can be converted into the ordinary direct type by opening both damper doors, thus taking the air from the room instead of the outside. The damper doors also make it possible to easily clean the base of any accumulation of dust and dirt. Can also furnish with opening at back so air conduit may be brought into radiator above floor level, instead of under base of radiator through floor.

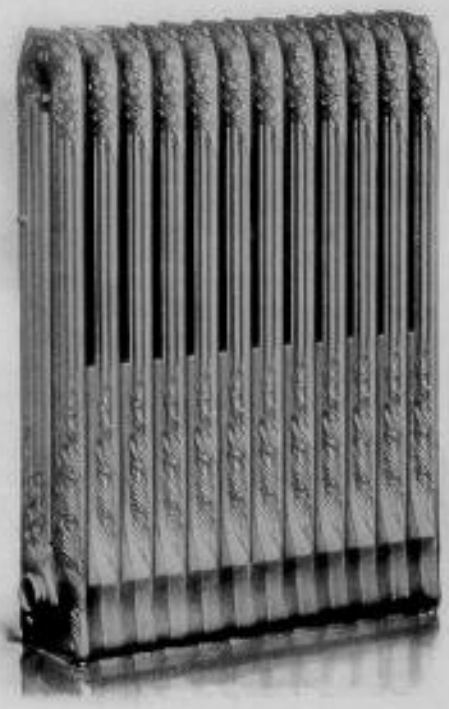
Dimensions and heating surface of Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Direct-Indirect Radiators are same as shown on page 15. Heights of flanges on the Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Direct-Indirect Radiators are as follows: 45-in. Height, 25½ inches; 38-in. Height, 18¼ inches; 31-in. Height, 18¼ inches; 25-in. Height, 15½ inches; 20-in. Height, 14½ inches.

Dimensions and heating surfaces of Rococo Direct-Indirect Radiators are same as shown on page 21. Heights of flanges on the Rococo Direct-Indirect Radiators are as follows: 44-in. Height, 23 inches; 38-in. Height, 21 inches; 32-in. Height, 17½ inches; 26-in. Height, 15 inches; 22-in. Height, 12½ inches; 18-in. Height, 11 inches.

If back opening is required, it will be necessary to know whether supply tapping is to be at right or left hand as you face the front of Radiator.

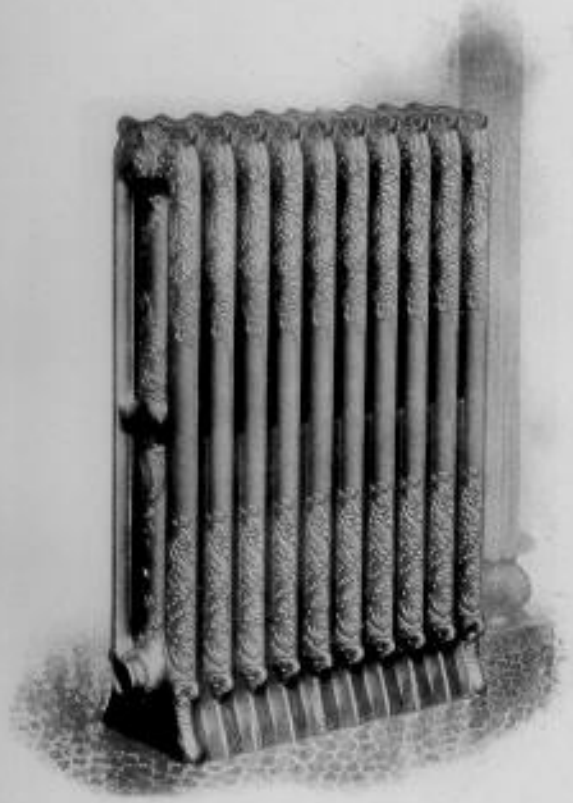
For Wall Boxes, see page 54.

For Floor Dampers to fit under Rococo Direct-Indirect Radiators, see page 121.



Detroit Ornamental Fluted Direct-Indirect Radiator.
(Patented June 24, 1890.)

See page 27.



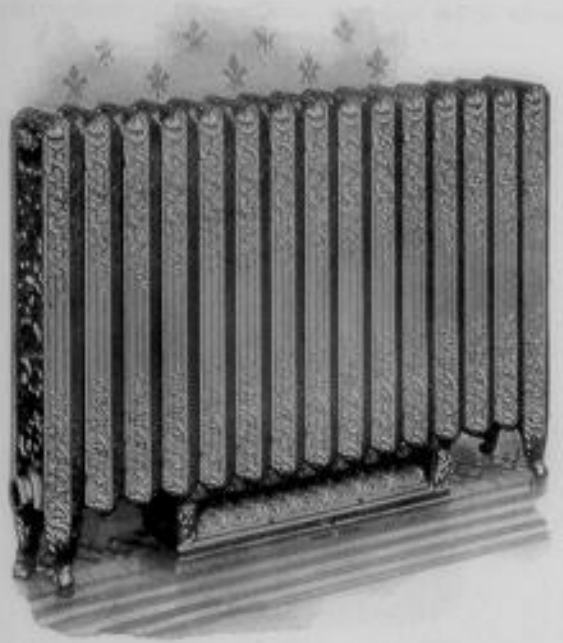
Rococo Direct-Indirect Radiator.
(Patented June 24, 1890.)

See page 27.

Italian Flue Box Base Steam and Hot Water Radiators.

(Patent applied for.)

See pages 31 to 35, inclusive.



Italian Flue Box Base Radiator.

See pages 32 to 35, inclusive.

Italian Flue Box Base Radiators—Continued.

Attention is invited to the merits of our Italian Flue Radiator, equipped with Box Base, for semi-direct heating. The radiator proper has become the recognized leader in the Flue type. Consisting of all cored, prime surface, it insures the highest efficiency in the most compact form.

PRINCIPLE OF CONSTRUCTION of Base is such that all the air required for ventilation may be taken from without the building by means of air conduit in wall, and distributed through Base into the interior or flue surface of radiator. When out-door tempera-

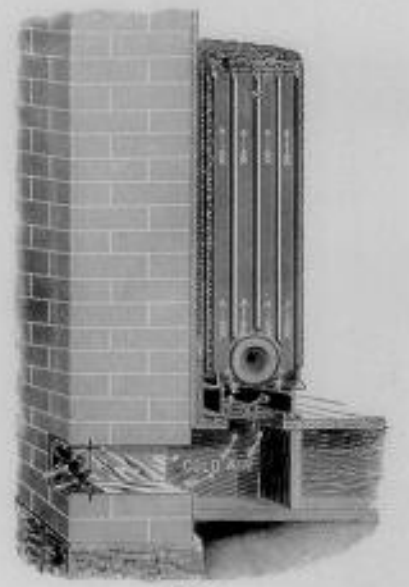


FIG. A.

ture is very low, dampers in Base may be adjusted to any smaller air capacity desired, regulating exactly the varying heating and ventilating requirements of the room; or dampers may be entirely closed, the radiator then acting wholly as a direct radiator.

LEADING FEATURES of the Box Base are simplicity of construction, ease of operation, capacity for ample supply of air. Base being wholly under the radiator, well recessed, is entirely out of the way and not liable to damage. Front of Base, including dampers, may easily be removed for cleaning purposes. Dampers may be operated merely by slight pressure of the foot.

Italian Flue Box Base Radiators—Continued.

AIR CONDUIT.—Fig. A (see page 32) shows view of radiator and Box Base with air conduit brought up underneath radiator, through floor. Fig. B shows air conduit brought in at back of radiator, above floor level. In this latter method it is necessary to use a galvanized or sheet iron sleeve to make connection between flange or collar cast around back air inlet of Base and a similar collar on back of Wall Box.

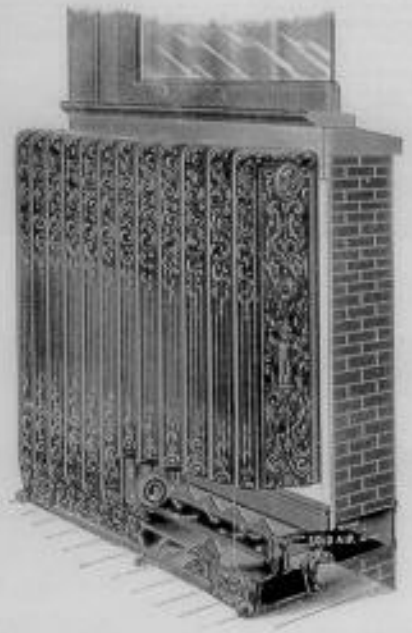


FIG. B.

Outside measurements of flange or lip around back air inlet of Box Base, for attaching sheet-iron sleeve or pipe, are:

BASE.	INCHES.	BASE.	INCHES.
12-section	24⅛ x 3¼	7-section	11⅜ x 3¼
11-section	21¼ x 3¼	6-section	9 x 3¼
10-section	18⅛ x 3¼	5-section	6 x 3¼
9-section	15⅛ x 3¼	4-section	5⅛ x 3¼
8-section	14⅛ x 3¼	3-section	2¼ x 3¼

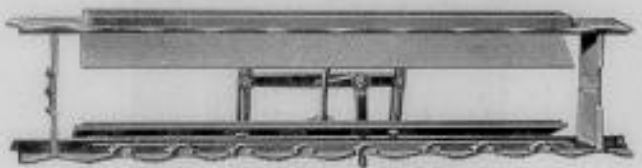
Italian Flue Box Base Radiators — Continued.

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:

BASE.	INCHES.	BASE.	INCHES.
12-section	24⅛ x 3⅝	7-section	11⅜ x 3⅝
11-section	21⅛ x 3⅝	6-section	8½ x 3⅝
10-section	18 x 3⅝	5-section	6½ x 3½
9-section	15⅛ x 3⅝	4-section	5½ x 3½
8-section	14⅜ x 3⅝	3-section	3¼ x 3½

NOTE.—12-section Box Base is to be used for radiator of twelve sections, or any EVEN number of sections larger. 11-section Box Base for radiator of eleven sections, or any ODD number of sections larger. Bottom of back air-inlet opening is one inch above floor level.

Showing Rear Half of Box Base and Dampers — Back Air Inlet Closed.
(Patent applied for.)



Box Base, Showing Operation of Dampers, for Bottom Air Inlet.
(Patent applied for.)

Wall Boxes.

These are substantially constructed, and their angle slats and inside copper wire screen render them storm and insect proof. Outside measurement of Wall Box is 5 x 17½ inches, to conform with brick measure.

Wall Box.

Italian Flue Box Base Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 3 inches per Sec.	HEATING SURFACE — SQUARE FEET.			
		39½-in. Height. 7 Sq. Ft. per Sec.	33½-in. Height. 5¾ Sq. Ft. per Sec.	27½-in. Height. 4½ Sq. Ft. per Sec.	21½-in. Height. 3¼ Sq. Ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Unless otherwise ordered, the Italian Flue Box Base Radiator is tapped 2 inches, and bushed according to list on page 50. For list of *special tappings*, see page 52.

Each section is 8½ inches wide.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples: Steam, 2 inches at bottom; Hot Water, 1¼ inches at top, 2 inches at bottom.

Top of each Hot Water leg has 1¼-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of tapping: single pipe Steam, 5½ inches; double pipe Steam, supply 6 inches, return 5½ inches; Hot Water, supply and return, 6 inches.

*In estimating *length* of Radiator, *allow ¼ inch* for each bushing.

Detroit Ornamental Fluted Dining Room Radiator, No. 4.

See page 37.

Detroit Ornamental Fluted Dining Room Radiators

Are an indispensable adjunct to any well appointed dining room, serving as a dish or food warmer. The oven or closet contains three shelves or racks, each 25½ inches long, 12¾ inches wide, with 8¾ inches space between each.

MADE ONLY IN 38-IN. HEIGHT, FOR STEAM AND HOT WATER.

LIST OF SIZES.

No.	*Length, Inches.	Heating Surface, Sq. Ft.
1	30 1/16	33½
2	34 1/16	42
3	39 1/16	50¾
4	43 1/16	59½
5	48 1/16	68
6	53 1/16	76¾
7	57 1/16	85½
8	62 1/16	94
9	67 1/16	102¾
10	71 1/16	111½

Unless otherwise ordered, the Detroit Dining Room Radiators are tapped 2 inches, and bushed in accordance with list on page 50. For list of *special tappings*, see page 52.

All openings will have right-hand threads, unless otherwise ordered.

Top of each Hot Water leg has 1½-inch plug, which can be taken out to make top connection when desired.

Connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.

Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

Outside or extreme depth of oven or closet is 13 inches, which fact should be borne in mind by fitters when arranging for connections, so that distance from wall to center of tapping shall not be less than 6½ inches.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Detroit Ornamental Fluted Wide Top Circular Radiator.

See page 39.

In addition to making, at our DETROIT PLANT, Circular Radiators in patterns as shown on page 39, we are preparing to make Circular Radiators in all heights of Verona and Rococo patterns, for Steam and Hot Water. Dimensions duly furnished on application.

Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Circular Radiators, for Steam and Hot Water.

LIST OF SIZES.

No. of Sections.	Outside Diameter at Legs, Inches.	Inside Diameter at Legs, Inches.
12	20¾	4½
14	22	6
16	24	8
18	25	9
20	26	10
22	27	11
24	28	12
26	29	13
28	30	14
30	32⅜	16¼
32	33	17
34	34	18
36	37	21
46	42¾	26¾

Above Circular Radiators are made in 45, 38, 31, 25 and 20 inch Heights, for Steam and Hot Water.

Unless otherwise ordered, these Radiators are tapped 2 inches, and bushed according to list on page 50. For list of *special tappings*, see page 52.

Detroit Circular Radiators are furnished in *two pieces*, forming two separate and distinct radiators, which are simply bolted together and can be taken apart, placed around a column and again bolted together. (See Note.) For one pipe work this Radiator has two tappings for valves; for two pipe work, and for Hot Water, it has four tappings for valves — two supply in front and two return in back.

When, however, above Circular Radiators are not intended to be placed around a column or post, they can, when specially ordered, be furnished all in *one piece*, having but one connection for valve for one pipe work and two connections for valves for two pipe work.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples: Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.

Distance from floor to center of either supply or return tapping in above Steam or Hot Water Circular Radiators, is 3¾ inches.

NOTE.—Circular Radiators can be made to work as one radiator, single pipe system, by use of elbows and tee.

Detroit Ornamental Fluted Corner Radiator.

See page 41.

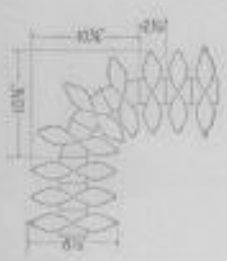
Curved and Corner Radiators

Are made at DETROIT PLANT in all heights and sizes of Verona, Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, Detroit Plain Fluted, Rococo, Italian Flue and Detroit Flue, for Steam and Hot Water, and of any desired radius or angle.

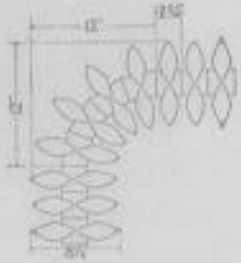
In ordering Curved and Corner or Angle Radiators, specify the exact radius or angle of the baseboard at floor within which the radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 149, 150 and 151.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tappings from floor, we must know (by sketch) which end of radiator is for supply and which for return, as you face the inside of angle or curve.

In estimating *length* of Radiators, *allow* ⅜ *inch* for each bushing.

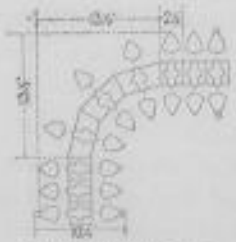


MEASUREMENTS FOR Verona.* Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Corner Radiators, for Steam and Hot Water. (3 sections to make corner.) For heights and heating surfaces of sections, see pages 11 and 15.

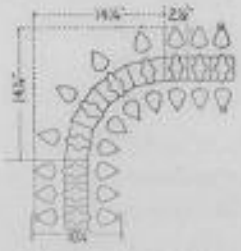


MEASUREMENTS FOR Verona.* Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Corner Radiators, for Steam and Hot Water. (4 sections to make corner.) For heights and heating surfaces of sections, see pages 11 and 15.

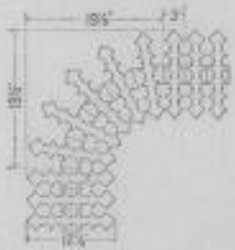
*In Verona Corner Radiators, add 2⅛ inches (instead of 2⅝ inches as shown in diagram) for each straight section beyond the sections required to make the Corner.



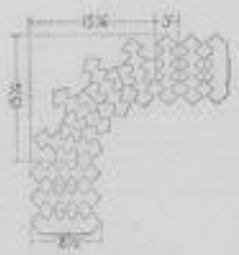
MEASUREMENTS FOR
Rococo Corner Radiators, for Steam and Hot Water.
(3 sections to make corner.)
For heights and heating surfaces of sections, see page 21.



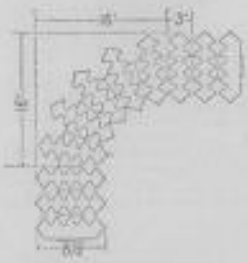
MEASUREMENTS FOR
Rococo Corner Radiators, for Steam and Hot Water.
(4 sections to make corner.)
For heights and heating surfaces of sections, see page 21.



MEASUREMENTS FOR
Detroit Flue Corner Radiators, for Steam or Hot Water.
(5 sections to make corner.)
For heights and heating surfaces of sections, see page 26.



MEASUREMENTS FOR
Italian Flue Corner Radiators, for Steam and Hot Water.
(4 sections to make corner.)
For heights and heating surfaces of sections, see page 23.

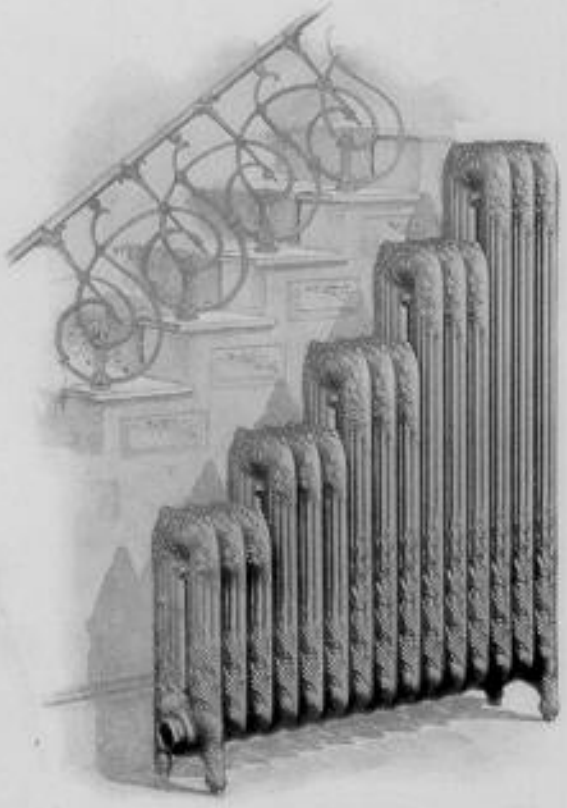


MEASUREMENTS FOR
Italian Flue Corner Radiators, for Steam and Hot Water.
(5 sections to make corner.)
For heights and heating surfaces of sections, see page 23.

Detroit Ornamental Fluted Window Radiator.

Made in all heights of Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Direct Steam and Hot Water Radiators, and in sizes to suit the requirements of any window.

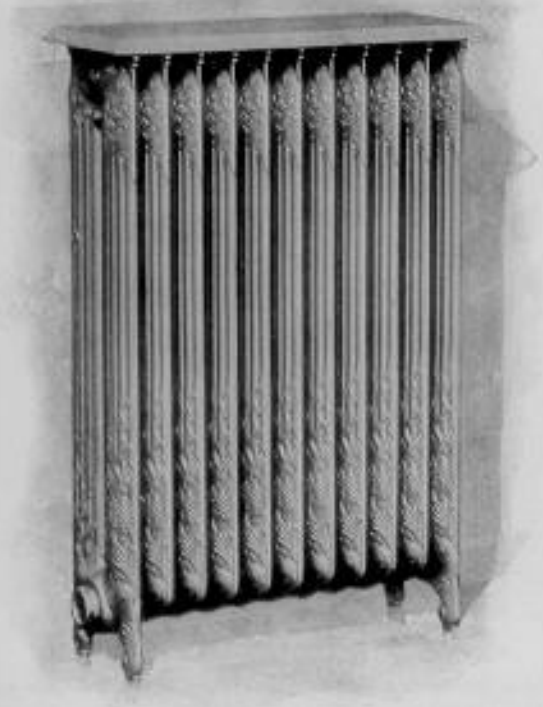
For heights, dimensions, and heating surfaces of sections, see page 15.



Detroit Ornamental Fluted Direct Steam Stairway Radiator.

Made in all heights of Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Direct Steam Radiators only, and in sizes to suit any pitch of stairway.

For heights, dimensions, and heating surfaces of sections, see page 15.



Detroit Ornamental Fluted Wide Top Radiator,

EQUIPPED WITH MARBLE TOP.

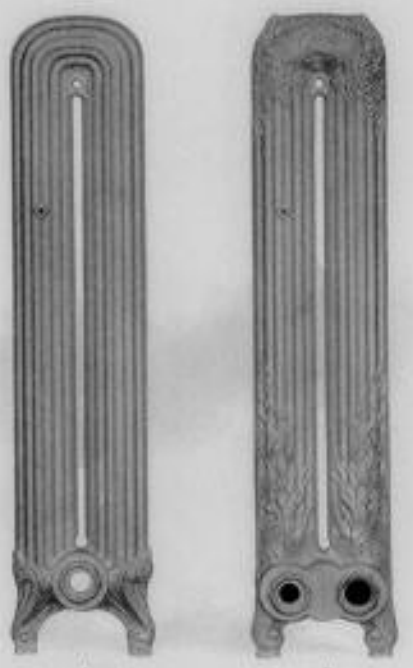
We can furnish any height of any style radiator made at DETROIT PLANT, with lugs cast on top of sections, so marble top may be fitted to same.

A B C

A—Detroit Ornamental Fluted Hot Water leg section, see page 14.

B—Detroit Ornamental Fluted Steam intermediate section, ... " 13.

C—Detroit Ornamental Fluted Steam leg section, showing Detachable High Leg and stub, . " 53.



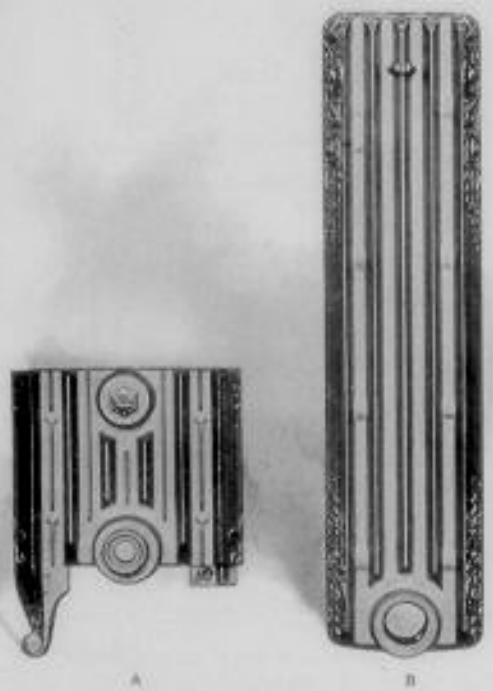
A B

A—Detroit Plain Fluted Steam leg section, ... see page 17.

B—Detroit Ornamental Fluted Steam leg section, with both supply and return tappings at bottom, " 52.

A B

A—Rococo Hot Water leg section, ... see page 20.
B—Rococo Hot Water intermediate section, . . . " 20.



A B

A—Detroit Flue leg section, showing Detachable High Leg and Stub, ... see pages 25 and 53.
B—Italian Flue Steam intermediate section, . . . see page 22.

Tapping List.*

Unless otherwise ordered, all styles of DETROIT PLANT Radiators shown on pages 5 to 55, inclusive, will be tapped or bushed as follows:

Steam.

One Pipe Work.

RADIATORS CONTAINING

24 square feet and under,	1	inch.
Above 24, but not exceeding 60 feet,	1¼	"
Above 60, " " 100 feet,	1½	"
Above 100 square feet,	2	"

Two Pipe Work.

RADIATORS CONTAINING

48 square feet and under,	1 x ¾	inch.
Above 48, but not exceeding 96 feet,	1¼ x 1	"
Above 96 square feet,	1½ x 1¼	"

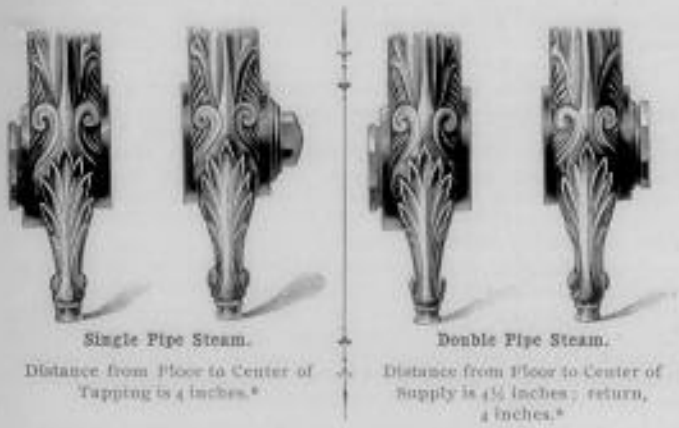
Hot Water.

TAPPED FOR SUPPLY AND RETURN.

Radiators, containing 40 square feet and under,	1	inch.
Above 40, but not exceeding 72 square feet,	1¼	"
Above 72 square feet,	1½	"

* For Bushing System, see page 51.

American Radiator Bushing System.



Single Pipe Steam.

Distance from Floor to Center of Tapping is 4 inches.*

Double Pipe Steam.

Distance from Floor to Center of Supply is 4½ inches; return, 4 inches.*

In Hot Water Radiators, distance from floor to center of either supply or return tapping is 4½ inches.*

Very often it is found necessary to change the tapping of Radiators after they are ordered and placed in buildings. The system illustrated here renders it very easy to make alterations without redrilling or retapping, by the use of Bushings. Above cuts represent the Detroit Ornamental Fluted Pattern.

Double tapping can be changed to single tapping by use of plug in supply end, and single to double by replacing plug with bushing for the supply connection.

Both supply and return legs have air valve tappings with interchangeable plug.

In ordering leg or end sections, specify whether for supply or return tapping; also, whether for single or double pipe work, as shown above.

For Detachable High Legs and Pedestals, to increase distance from floor to center of tapping to any height desired, see page 53.

*These measurements do not apply to Detroit Flue (see page 26); Detroit Circular (see page 39); Direct Steam Radiators with supply and return tappings at bottom of same end (see page 52); nor to Italian Flue Box Base Radiators (see page 35).

Special Tappings.

AIR VALVE TAPPINGS.—Both supply and return legs have air valve tappings, with interchangeable plugs. All air valve tappings are regularly made ⅛ inch, but when specially ordered they can be furnished ¼ inch.

TAPPINGS FOR SUPPLY AND RETURN AT BOTTOM OF SAME END, FOR STEAM.—This style of tapping, as shown on page 47, can be furnished in all heights of Verona, Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, Detroit Plain Fluted, Rococo, and Italian Flue Radiators, for Steam. Both tappings are two inches, and bushed according to list on page 50. Distance between centers of tappings is 4½ inches; distance from floor to center of either tapping is 4 inches.

Supply tapping can be made at either right or left hand, as you face tappings, by merely changing location of bushings.

TAPPINGS FOR TOP FEED AND BOTTOM RETURN AT SAME END.—Top of each leg section in all styles and heights of Hot Water Radiators made at DETROIT PLANT has 1½-in. plug (except Rococo Hot Water Radiators, which have 2-inch plug), which can be taken out to make top connection, when desired.

In Verona Hot Water Radiators, distance between centers of upper and lower tappings is—in the 38-in. Height, 31⅞ inches; 32-in. Height, 25¾ inches; 26-in. Height, 19½ inches; 20-in. Height, 13½ inches.

In Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted Hot Water Radiators, distance between centers of upper and lower tappings is—in the 45-in. Height, 39⅞ inches; 38-in. Height, 32⅞ inches; 31-in. Height, 24¾ inches; 25-in. Height, 18¾ inches; 20-in. Height, 13¾ inches.

In Rococo Hot Water Radiators, distance between centers of upper and lower tappings is—in the 44-in. Height, 35¼ inches; 38-in. Height, 31 inches; 32-in. Height, 23¾ inches; 26-in. Height, 18 inches; 22-in. Height, 14⅞ inches; 18-in. Height, 10¼ inches.

In Italian Flue Hot Water Radiators, distance between centers of upper and lower tappings is—in the 38-in. Height, 31⅞ inches; 32-in. Height, 25⅞ inches; 26-in. Height, 19½ inches; 20-in. Height, 13⅞ inches.

In Italian Flue Box Base Hot Water Radiators, distance between centers of upper and lower tappings is—in the 39½-in. Height, 31⅞ inches; 33½-in. Height, 25⅞ inches; 27½-in. Height, 19½ inches; 21½-in. Height, 13⅞ inches.

In Detroit Flue Hot Water Radiators, distance between centers of upper and lower tappings is—in the 20-in. Height, 15⅛ inches; 18-in. Height, 13⅛ inches; 16-in. Height, 11¼ inches; 14-in. Height, 9⅛ inches; 13-in. Height, 8¼ inches.

TAPPING AT EXTREME TOP OR BOTTOM OF FIRST OR SECOND SECTION OF STACK.—When so ordered, can place special tapping of 1½ inch or smaller at extreme top of first or second section of stack, or at bottom of second section, in any pattern made at DETROIT PLANT, except on the top of second section of the Italian Flue and Detroit Flue patterns, which can only be tapped 1 inch or smaller.

Detachable High Legs

(Patent applied for)

As shown on page 46, are made, upon special order, at DETROIT PLANT, for all heights of Verona, Detroit Ornamental Fluted, Detroit Plain Fluted and Rococo Radiators. Italian Flue Radiators are regularly furnished with Detachable Legs.

These legs can be furnished in any height desired, so that center of supply tapping will be 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½ or 9 inches from floor.

The Detroit Flue Radiators can also be furnished with Detachable High Legs, as shown on page 49, to make distance from floor to center of supply tapping 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½ or 9 inches.

These legs are detached and shipped separately, thus removing possibility of breakage.

The size of each pair of Detachable Legs is cut on the inside of each half, as "4 x 4½." These numbers show the distance which the legs will bring the center of the tapping from floor. For example, the 4 x 4½ legs are the standard height legs and bring both tappings of a Water Radiator 4½ inches from floor; in a double pipe Steam job, the supply would be 4½ inches and the return 4 inches from floor; in a single pipe Steam job the supply or low drip end would be 4 inches from floor.

In ordering radiators having Detachable Legs, always give distance from floor to center of what is to be the supply tapping of radiator; and when for Steam radiators, be sure to state whether for one or two pipe job.

Pedestals.

The Pedestals shown on pages 94 and 140 will also fit under all patterns and heights of radiators made at DETROIT PLANT.

Specialties.

We make the following special shapes of Radiators at our DETROIT PLANT:

VERONA —

DETROIT ORNAMENTAL FLUTED —

DETROIT ORNAMENTAL FLUTED WIDE TOP —

DETROIT PLAIN FLUTED —

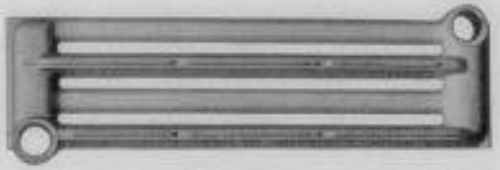
Specialties — Continued.

ROCOCO —

ITALIAN FLUE —

DETROIT FLUE —

Primus Hot Water Indirect.



Single Section.

Each section of Primus Hot Water Indirect Radiator contains 8 square feet of all cored, prime heating surface.

Length of section, 38 inches. Height, 11 inches.

Width each section occupies in stack, 3½ inches.

Nipples for connecting are extra heavy 2-inch right and left hand threaded, with hexagon nut at the center.

Regular tapping is 2 inches, but can be bushed to any smaller size desired. Supply and return tappings are both right hand.

For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. When ordering, customer should specify sizes of stacks into which sections will be built, so provision may be made for sending proper number of air-vent sections.

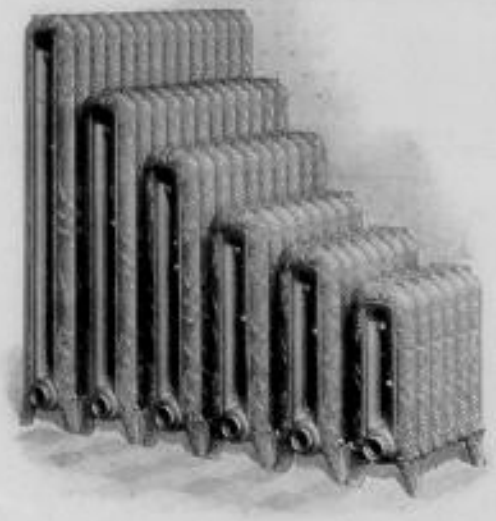
Complete Stack.

ALL RADIATORS

Illustrated on pages 57 to 104, inclusive, are manufactured at our

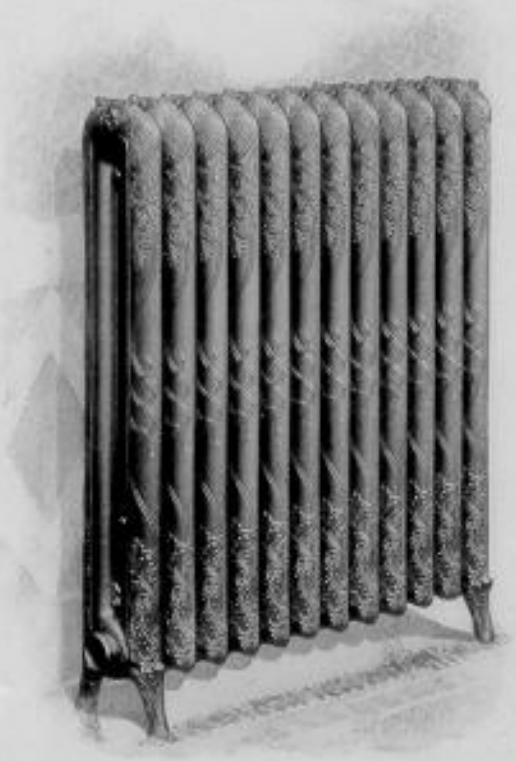
PIERCE PLANT,

Buffalo, N. Y.



National Direct Steam Radiators.*
45, 38, 32, 26, 23 and 20 in. Heights.
See page 63.

National Direct Steam Radiator.
See page 63.



National Direct Hot Water Radiator.
See page 65.

Ideal Direct Steam Radiator.
See page 63.

Peerless Direct Steam Radiator.

See page 63.

National, Ideal and Peerless Direct Steam Radiators.

LIST OF SIZES.

No. of Sections.	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET. 45-in. Height. 5 Sq. Ft. per Sec.	38-in. Height. 4 Sq. Ft. per Sec.	32-in. Height. 3½ Sq. Ft. per Sec.	26-in. Height. 2½ Sq. Ft. per Sec.	23-30. Height. 2½ Sq. Ft. per Sec.	20-in. Height. 2 Sq. Ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64

Unless otherwise ordered, the National and Peerless Steam Radiators are tapped 2 inches, and bushed according to list on page 91.

Unless otherwise ordered, Ideal Steam Radiators in 38-inch Height are tapped 2 inches and bushed according to list on page 91; other heights are tapped *solid* according to same list. For list of *special tappings*, see page 91.

Each section is 7½ inches wide. Width of legs, 8⅛ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at bottom with 2-inch right-hand threaded nipples.

Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, supply 4½ inches, return 4 inches. In other than 38-inch Height of Ideal Steam Radiators, distance from floor to center of either supply or return tapping is 4½ inches.

*In estimating *length* of 38-inch Ideal and all heights of National and Peerless Steam Radiators, *allow ½ inch* for each bushing.

Peerless Direct Hot Water Radiator.

See page 65.

National and Peerless Direct Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length, 2½ in. per Sec.	HEATING SURFACE — SQUARE FEET.					
		45-in. Height. 5 Sq. Ft. per Sec.	38-in. Height. 4 Sq. Ft. per Sec.	32-in. Height. 3½ Sq. Ft. per Sec.	26-in. Height. 2½ Sq. Ft. per Sec.	23-in. Height. 2⅓ Sq. Ft. per Sec.	20-in. Height. 2 Sq. Ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64

Unless otherwise ordered, above Radiators will be tapped 2 inches, and bushed in accordance with list on page 91. For list of *special tappings*, see page 90.

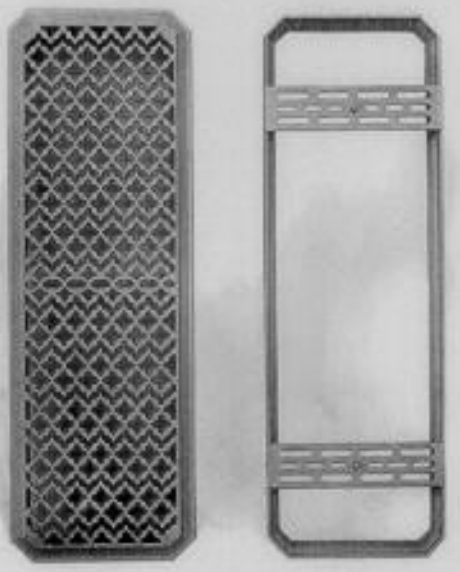
Each section is 7⅛ inches wide. Width of legs, 8½ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at top and bottom with extra-heavy 2½-inch slip nipples.

Distance from floor to center of either supply or return tapping is 4½ inches.

* In estimating *length of* Radiator, *allow* ½ *inch* for each bushing.



A B

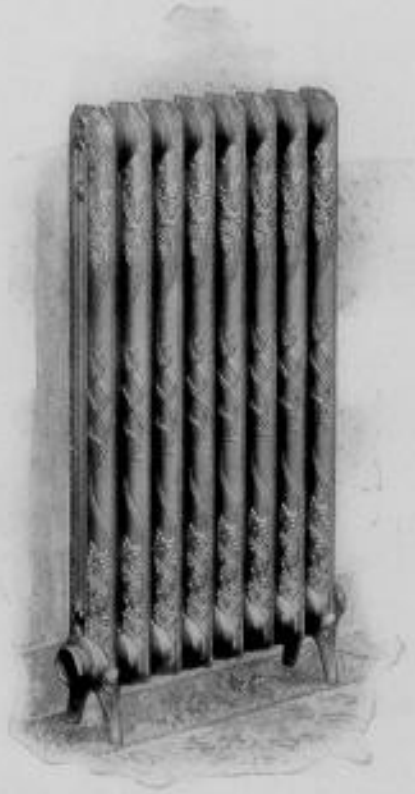
A—Excelsior Cast-iron Top, ... see page 66.

B—Excelsior Binder for marble top, ... " 66.

National Single Column Direct Steam Radiator.

See page 71.

We are preparing to furnish a Single Column Radiator in plain pattern, for Steam and Hot Water, to be known as "Peerless Single Column Radiator." Sizes and dimensions duly furnished on application.



National Single Column Direct Hot Water Radiator.

See page 71.

We are preparing to furnish a Single Column Radiator in plain pattern, for Steam and Hot Water, to be known as "Peerless Single Column Radiator." Sizes and dimensions duly furnished on application.

National Single Column Direct Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length, 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height. 3 Sq. Ft. per Sec.	32-in. Height. 2½ Sq. Ft. per Sec.	26-in. Height. 2 Sq. Ft. per Sec.	23-in. Height. 1⅔ Sq. Ft. per Sec.	20-in. Height. 1⅓ Sq. Ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

Unless otherwise ordered, National Single Column Steam Radiators are tapped *solid*, according to list on page 21. Unless otherwise ordered, National Single Column Hot Water Radiators are tapped 2 inches, and bushed according to list on page 21. For list of *special tappings*, see page 23.

Each section is 4⅛ inches wide. Width of legs, 5½ inches.

All openings will have right-hand threads, unless otherwise ordered.

National Single Column Radiators for Steam are connected with 2-inch, right-hand threaded, extra-heavy nipples; for Hot Water, 2½-inch extra-heavy slip nipples, at top and bottom.

Distance from floor to center of tapping is 4⅛ inches, for both Steam and Hot Water.

*In estimating *length* of this Radiator for Hot Water, allow ½ inch for each bushing.

Rococo Direct Hot Water Radiator.
See page 73.

Rococo Direct Hot Water Radiators.

LIST OF SIZES.

No. of Sections	*Length. 2½ in per Sec.	HEATING SURFACE—SQUARE FEET.					
		44-in. Height. 6 Sq. Ft. per Sec.	38-in. Height. 5 Sq. Ft. per Sec.	32-in. Height. 4½ Sq. Ft. per Sec.	26-in. Height. 3½ Sq. Ft. per Sec.	22-in. Height. 3 Sq. Ft. per Sec.	18-in. Height. 2½ Sq. Ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Unless otherwise ordered, the Rococo Radiators are tapped 2 inches, and bushed according to list on page 91. For list of *special tappings*, see page 93.

Each section is 10 inches wide. Width of legs, 10⅝ inches.

All openings will have right-hand threads, unless otherwise ordered.

Top of each leg section has 1¼-inch plug, which can be taken out to make top connection when desired.

All Rococo Radiators made at PEERLESS PLANT are connected at top and bottom with extra heavy 2½-inch slip nipples.

Distance from floor to center of either supply or return tapping is 4½ inches.

NOTE.—When Rococo Hot Water Radiators are wanted connected with right and left hand threaded nipples, can furnish from our Plants at Detroit. See pages 20, 21, 112 and 115.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

National Four Column Direct Steam or Hot Water Radiator.

See page 75.

National Four Column Direct Steam or Hot Water Radiator.

LIST OF SIZES.

No. of Sections.	*Length, 2½ inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height. 3 Sq. Ft. per Sec.	32-in. Height. 6⅔ Sq. Ft. per Sec.	26-in. Height. 3⅓ Sq. Ft. per Sec.	23-in. Height. 4⅓ Sq. Ft. per Sec.	20-in. Height. 4 Sq. Ft. per Sec.
2	5½	16	13⅓	10⅔	9⅓	8
3	8¼	24	20	16	14	12
4	11	32	26⅔	21⅓	18⅔	16
5	13¾	40	33⅓	26⅔	23⅓	20
6	16½	48	40	32	28	24
7	19¼	56	46⅔	37⅓	32⅔	28
8	22	64	53⅓	42⅔	37⅓	32
9	24¾	72	60	48	42	36
10	27½	80	66⅔	53⅓	46⅔	40
11	30¼	88	73⅓	58⅔	51⅓	44
12	33	96	80	64	56	48
13	35¾	104	86⅔	69⅓	60⅔	52
14	38½	112	93⅓	74⅔	65⅓	56
15	41¼	120	100	80	70	60
16	44	128	106⅔	85⅓	74⅔	64
17	46¾	136	113⅓	90⅔	79⅓	68
18	49½	144	120	96	84	72
19	52¼	152	126⅔	101⅓	88⅔	76
20	55	160	133⅓	106⅔	93⅓	80
21	57¾	168	140	112	98	84
22	60½	176	146⅔	117⅓	102⅔	88
23	63¼	184	153⅓	122⅔	107⅓	92
24	66	192	160	128	112	96
25	68¾	200	166⅔	133⅓	116⅔	100

Unless otherwise ordered, National Four Column Radiators are tapped 2 inches, and bushed according to list on page 91. For list of *special tappings*, see page 93.

Each section is 10½ inches wide; width of legs, 11¼ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at top and bottom with extra-heavy 2¼-inch slip nipples.

Distance from center of either supply or return tapping to floor is 4½ inches.

*In estimating *length* of Radiator, *allow* ½ *inch* for each bushing.

National Direct-Indirect Radiator.

(Patented November 10, 1891.)

See page 77.

Direct-Indirect Radiators

Are made at PIERCE PLANT in 45, 38, 32, 26, 23 and 20 in. Heights of National, for Steam and Hot Water. List of sizes, heating surfaces and dimensions are same as shown on pages 63 and 65.

We call especial attention to some of the important features in our National Direct-Indirect Radiator:

Lower portion of radiator is enclosed with *detachable* plates placed between the sections in a manner to give ample space for introduction of air under base of radiator and between sections. Plates may be removed for dusting and sweeping under radiator whenever desired. When cold air is supplied through conduit in wall, *above* the floor, a sufficient number of plates may be raised to any desired height to conform with the opening in wall, and the air introduced at back of radiator.

In the 45, 38 and 32 in. Heights, the movable plates extend 16 inches in height of radiator. In the 26, 23 and 20 in. Heights, plates extend 11 inches in height of radiator.

NOTE.—Unless otherwise ordered, the National Direct-Indirect Radiators are tapped *solid*, according to list on page 91.

For Wall Boxes, see page 34.

National Circular Radiator.

See page 79.

National, Ideal, Peerless and National Single Column Circular Steam Radiators.

LIST OF SIZES.

NATIONAL, IDEAL AND PEERLESS STEAM.			NATIONAL SINGLE COLUMN STEAM.		
No. of Sections.	Outside Diam. at Leg	Inside Diam. at Leg	No. of Sections.	Outside Diam. at Leg	Inside Diam. at Leg
16	23⅛	6⅛	16	20⅝	9⅛
20	25⅞	8⅞	20	22⅞	11⅜
24	28¾	11¼	24	25¼	14¼
25	29⅜	12⅛	25	26⅛	15⅛
28	31⅝	14⅛	28	28⅛	17⅛
30	32¾	15⅝	30	29⅜	18⅜
32	34¾	17¼	32	31¼	20¼
33	35	18	33	32	21
36	37 1/16	20 1/16	36	34 1/16	23 1/16
38	38 7/16	21 7/16	38	35 7/16	24 7/16
40	39⅞	22⅞	40	36⅞	25⅞
44	42⅝	25⅝	44	39⅝	28⅝
50	46¼	29¼	50	43¼	32¼

Made in all heights and of heating surfaces as shown on pages 63 and 71.

Above Circular Radiators are tapped *solid* 1½ inches, or smaller, according to list on page 91.

Circular Radiators for one pipe work are practically two separate radiators; they are not joined at the back. (See Note below.)

When for two pipe work and for Hot Water, they are joined at the back with special nipple; both supply and return being at the front, and the supply tapping being at right hand as you face the radiator.

Connected at bottom with 2-inch right-hand threaded nipples.

Distance from floor to center of either supply or return tapping is 4½ inches.

NOTE.—They can be made to work as one radiator on single pipe system by use of elbows and tee.

AMERICAN RADIATORS

National Corner Radiator.

See page 81.

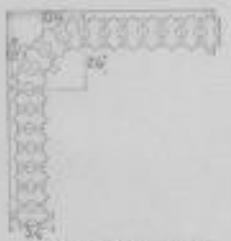
Curved and Corner Radiators

Are made at PIERCE PLANT in all heights and sizes of National, Ideal, Peerless and National Single Column, for Steam only, and of any desired radius or angle.

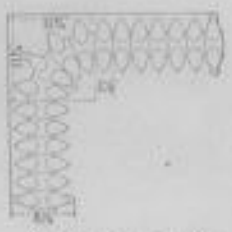
In ordering Curved and Corner or Angle Radiators, specify the exact radius or angle of the baseboard at floor within which the radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 149, 150 and 151.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return tappings from floor, we must know (by sketch) which end of radiator is for supply and which for return, as you face the inside of angle or curve.

In estimating *length* of Radiators, *allow ½ inch* for each bushing.



MEASUREMENTS FOR
National Single Column Steam Corner Radiators.
(4 sections to make corner.)
For heights and heating surfaces of sections, see page 71.



MEASUREMENTS FOR
National, Ideal and Peerless Steam Corner Radiators.
(4 sections to make corner.)
For heights and heating surfaces of sections, see page 63.

Rococo Hot Water Radiator.

See page 73.

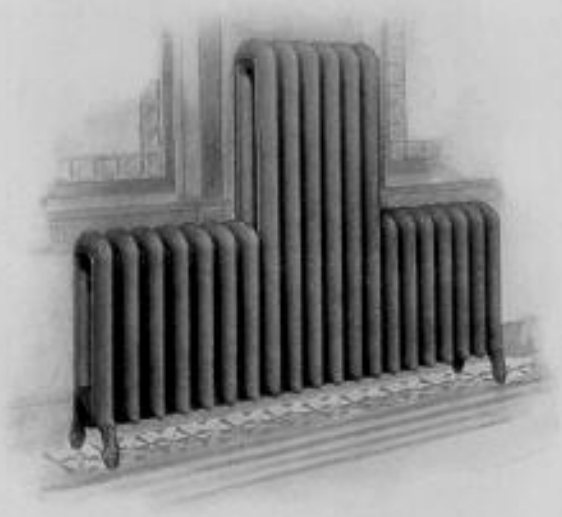
National Four Column Direct Steam or Hot Water Radiator.

See page 75.

National Direct Steam Window Radiator.

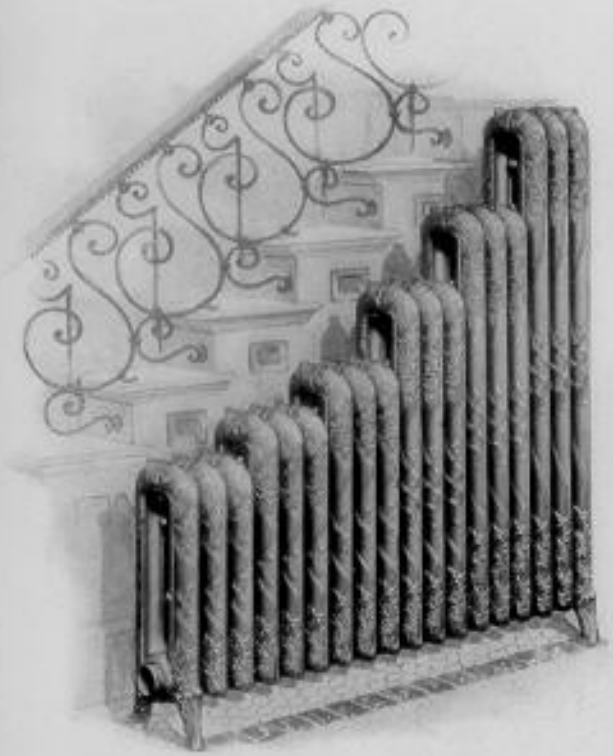
Made in all heights of National, Ideal, Peerless and National Single Column, for Steam only, and in sizes to suit the requirements of any window.

For heights, dimensions and heating surfaces of sections, see pages 63 and 71.



Peerless Direct Steam Window Radiator.

Made in all heights of Peerless, National, Ideal and National Single Column, for Steam only, and in sizes to suit the requirements of any window.
For heights, dimensions and heating surfaces of sections, see pages 63 and 71.



National Direct Steam Stairway Radiator.

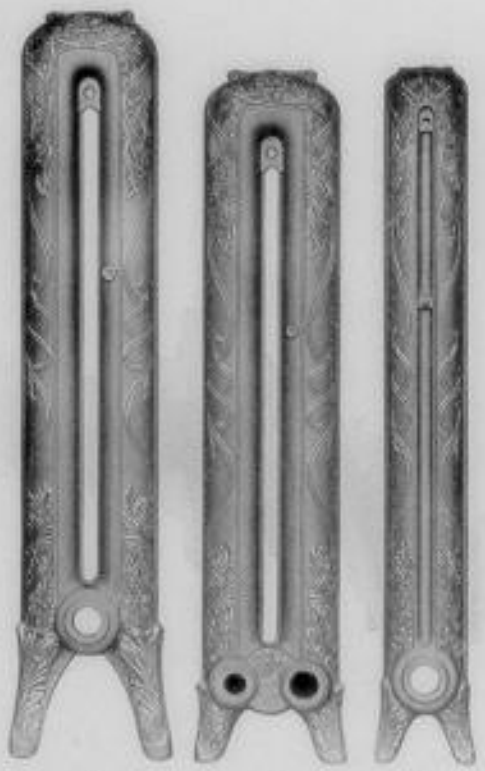
Made in all heights of National, Ideal, Peerless and National Single Column, for Steam only, and in sizes to suit any pitch of stairway.
For heights, dimensions and heating surfaces of sections, see pages 63 and 71.

A B C

A—National Direct Steam Leg, showing detachable high leg and stub, ... see page 94.

B—National Direct Hot Water, intermediate section, " " 60.

C—National Direct Steam, intermediate section, . " " 59.



A B C

A—National Steam extra high solid leg section, . . . see page 94.

B—National Steam leg section, with both supply and return tappings at bottom of same end, . . " " 93.

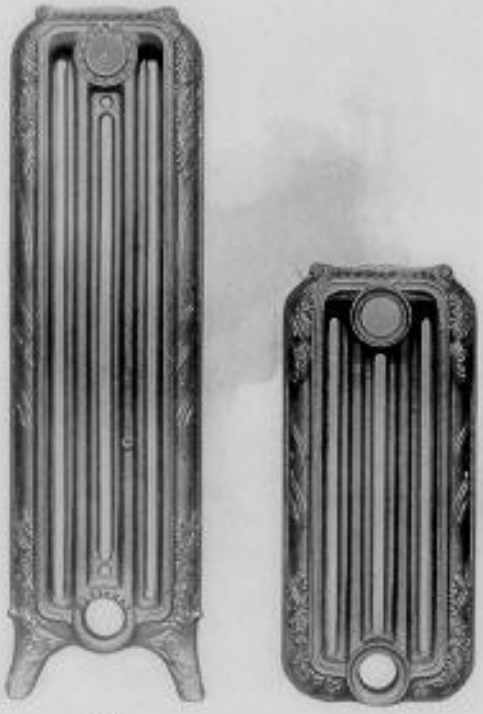
C—National Single Column Steam leg section, . . " " 69.

A B C

A—Ideal Steam leg section, ... see page 61.
B—Ideal Steam intermediate section, ... " " 61.
C—Peerless Steam intermediate section, ... " " 62.

A B

A—Rococo Hot Water leg section, ... see page 72.
B—Rococo Hot Water intermediate section, ... " " 72.



A B

A—National Four Column Hot Water leg section, . see page 74.

B—National Four Column Hot Water intermediate section, ... " " 74.

Tapping List.*

Unless otherwise ordered, all Radiators made at PIERCE PLANT, shown on pages 57 to 95, inclusive, will be tapped or bushed (see Note, page 92) as follows:

Steam.

One Pipe Work.

RADIATORS CONTAINING

24 square feet and under, ...	1 inch.
Above 24, but not exceeding 60 feet, ...	1¼ "
Above 60, " " 100 feet, ...	1½ "
Above 100 square feet, ...	2 "

Two Pipe Work.

RADIATORS CONTAINING

48 square feet and under, ...	1 x ¼ inch.
Above 48, but not exceeding 96 feet, ...	1¼x1 "
Above 96 square feet, ...	1½x1¼ "

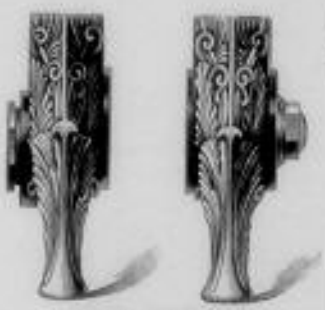
Hot Water.

TAPPED FOR SUPPLY AND RETURN.

Radiators, containing 40 square feet and under, . .	1 inch.
Above 40, but not exceeding 72 square feet, ...	1¼ "
Above 72 square feet, ...	1½ "

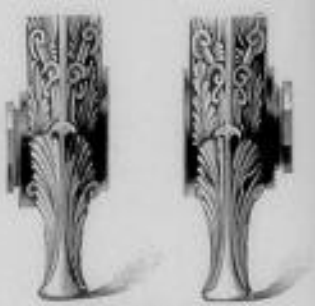
* For Bushing System, see page 92.

American Radiator Bushing System.



Single Pipe Steam.

Distance from Floor to Center of Tapping is 4 inches.*



Double Pipe Steam.

Distance from Floor to Center of Supply Tapping is 4½ inches; Return, 4 inches.*

In Hot Water Radiators, distance from floor to center of either supply or return tapping is 4½ inches.*

Very often it is found necessary to change the tapping of Radiators after they are ordered and placed in buildings. The system illustrated here renders it very easy to make alterations without redrilling or retapping, by the use of Bushings. Above cuts represent the National Pattern.

Double tapping can be changed to single tapping by use of plug in supply end, and single to double by replacing plug with bushing for the supply connection.

Both supply and return legs have air valve tappings with interchangeable plug, except when solid tapping is used, when only return leg has air valve tapping.

In ordering leg or end sections, specify whether for supply or return tapping; also, whether for single or double pipe work, as shown above.

NOTE.—Bushing system does not apply to National Single Column Steam; National Direct-Indirect Radiators; Circular Radiators; Direct Steam Radiators with supply and return tappings at bottom of same end; nor to other than 38-inch Heights of Ideal Steam and Excelsior Steam.

For Detachable High Legs and Pedestals, to increase distance from floor to center of tapping to any desired height, see page 94.

*These measurements do not apply to Direct Steam Radiators with supply and return tappings at bottom of same end (see page 93); National Single Column Steam (see page 71); National Four Column Steam (see page 75); Circular Steam Radiators (see page 79); Steam Radiators equipped with Detachable Legs (see page 94); nor to other than 38-inch Heights of Ideal and Excelsior Steam (see pages 63 and 67).

Special Tappings.

AIR VALVE TAPPINGS.—Both supply and return legs have air valve tappings, with interchangeable plugs (except when *solid* tapping is used, the return leg only is air vented). All air valve tappings are regularly made ⅛ inch, but when specially ordered they can be furnished ¼ inch.

TAPPINGS FOR SUPPLY AND RETURN AT BOTTOM OF SAME END, FOR STEAM.—This style of tapping, as shown on page 87, can be furnished in all heights of National, Ideal, Peerless, Excelsior and National Single Column Steam Radiators. Both tappings are *solid*, according to list on page 91. Distance between centers of tappings is 3¾ inches; distance from floor to center of either tapping is 4½ inches.

Can also furnish this style tapping on National Four Column and Rococo Water, all heights. Both tappings are *solid*, according to list on page 91. Distance between centers of tappings is 4⅝ inches; distance from floor to center of either tapping is 4½ inches.

When not ordered to the contrary, the supply will always be at the right hand as you face the tappings.

TAPPING FOR TOP FEED AND BOTTOM RETURN AT SAME END.—This style of tapping can be furnished on all heights and styles of Hot Water Radiators.

In National and Peerless Hot Water Radiators, the distance between centers of upper and lower tappings is—in the 45-in. Height, 38⅞ inches; 38-in. Height, 31¾ inches; 32-in. Height, 25⅞ inches; 26-in. Height, 19½ inches; 23-in. Height, 16¾ inches; 20-in. Height, 13⅜ inches.

In National Single Column Hot Water Radiators, the distance between centers of upper and lower tappings is—in the 38-in. Height, 31⅞ inches; 32-in. Height, 25¾ inches; 26-in. Height, 19⅞ inches; 23-in. Height, 16¾ inches.

In Rococo Hot Water Radiators, made at PIERCE PLANT, distance between centers of upper and lower tappings is—in the 44-in. Height, 35½ inches; 38-in. Height, 31¾ inches; 32-in. Height, 25 inches; 26-in. Height, 19¾ inches; 22-in. Height, 15¾ inches; 18-in. Height, 11 inches. (In Rococo Hot Water Radiators top of each leg section has 1½-inch plug, which can be taken out to make top connection when desired.)

In National Four Column Hot Water Radiators, the distance between centers of upper and lower tappings is—in the 38-in. Height, 30¾ inches; 32-in. Height, 25⅞ inches; 26-in. Height, 19⅞ inches; 23-in. Height, 16¾ inches; 20-in. Height, 13¾ inches.

TAPPING AT EXTREME TOP OR BOTTOM OF FIRST OR SECOND SECTION OF STACK.—When so ordered, can place special tapping of 1 inch or smaller at extreme top of first or second section or at bottom of second section of stack in any pattern made at PIERCE PLANT.

Detachable High Legs

(Patent applied for)

As shown on page 86, are made, upon special order, for all styles and heights of Direct Radiators manufactured at PIERCE PLANT, except for National Single Column and National Four Column.

They can be furnished in any height desired, so that center of supply tapping will be 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½ or 9 inches from floor.

These legs are detached and shipped separately, thus removing possibility of breakage.

In ordering radiators having detachable legs, always give distance from floor to center of what is to be the supply tapping of radiator; and when for steam, be sure to state whether for one or two pipe work. All Steam Radiators made at PIERCE PLANT, with Detachable Legs, are tapped *solid*, according to list on page 91.

Extra High Solid Legs

As shown on page 87, can be furnished on all heights of National (two column) Steam and Hot Water Radiators, Ideal Steam, and National Single Column Steam, so that distance from floor to center of tapping will be 5, 5½, 6, 6½, 7 or 7½ inches, as ordered.

In ordering radiators having extra-high solid legs, always give distance required from floor to center of what is to be the supply tapping of radiator; and when for Steam, be sure to state whether for one or two pipe work.

Pedestals

To fit under legs of all styles and heights of Direct Radiators can be furnished in the following heights: ½, ¾, 1, 1¼, 1½, 1¾, 2, 2¼, 2½, 3, 3½, 4, 4½ and 5 inches.

Pedestals shown on page 140 will also fit under legs of all patterns made at PIERCE PLANT.

Specialties.

We make the following special shapes of Radiators at our PIERCE PLANT:

NATIONAL —

Circular for Steam only,	see pages 78 and 79.
Curved " "	" 81.
Corner " "	" 80 " 81.
Direct-Indirect for Steam and Hot Water,	" 76 " 77.
Window for Steam only,	" 83 " 84.
Stairway " "	" 85.
Marble Top, arranged with Saddles for Steam and Hot Water,	" 152.

IDEAL —

Circular for Steam only,	see page 79.
Curved " "	" 81.
Corner " "	" 81.
Window " "	" 83 and 84.
Stairway for Steam only,	" 85.
Marble Top, arranged with Saddles for Steam only,	" 152.

PEERLESS —

Circular for Steam only	see page 79.
Curved " "	" 81.
Corner " "	" 81.
Window " "	" 83 and 84.
Stairway " "	" 85.
Marble Top, arranged with Saddles for Steam and Hot Water,	" 152.

EXCELSIOR —

Marble Top, arranged with Binder for.	see pages 66 and 68.

NATIONAL SINGLE COLUMN —

Circular for Steam only,	see page 79.
Curved " "	" 81.
Corner " "	" 81.
Window " "	" 83 and 84.
Stairway " "	" 85.
Marble Top, arranged with Saddles for Steam and Hot Water,	" 152.

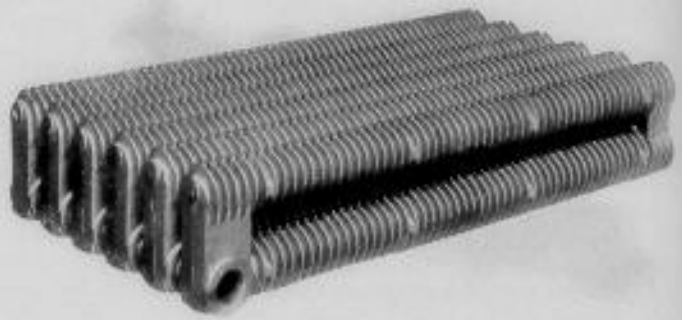
ROCOCO HOT WATER —

Marble Top, arranged with Saddles for.	see page 152.

NATIONAL FOUR COLUMN —

Marble Top, arranged with Saddles for.	see page 152.

Excelsior Indirect Radiators for Steam and Hot Water.



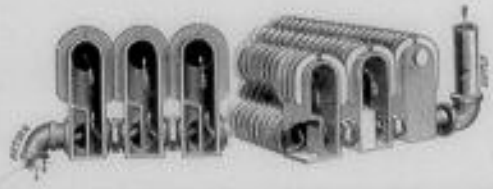
Excelsior Indirect Steam Radiator, Complete Stack.

This Radiator has two nearly horizontal pipes or tubes inclined in opposite directions, and connected at the ends so as to form a complete pipe circuit. In one of the ends or upright sections, a diaphragm or partition is so arranged as to stop the flow of steam from the inlet directly to the outlet opening, but at the same time allows the water of condensation to pass under it, and directly through the radiator, and from radiator to radiator when connected together in stacks. From the exterior surfaces of the radiators are extended thin flanges for the purpose of dividing and subdividing the volume of air as it comes in contact with each stack, so that in its passage about the radiators and through the stack the air becomes *thoroughly and evenly warmed*.

Circulation of Steam.

The cut on page 97 shows the *outlet* opening. The *steam* enters the opposite opening and passes up the vertical section and into the upper pipe, thence along this pipe down into and along the lower pipe and out of the outlet opening shown, and (if another radiator is connected) into the next radiator, and so on from radiator to radiator, through the stack.

Excelsior Indirect Radiators — Continued.



End View, Excelsior Indirect Steam Radiator, Showing Circulation.

The above cut shows:

First.—The supply pipe attached, as it should *always be*, to the *right-hand side* of stack, and return pipe to the left-hand side.

Second.—The distance the sections should be set from each other, which should be so the flanges will interlock about ⅝ inch. When specially ordered, however, sections will be connected with extra-long nipples, to give additional air area between the sections.

Third.—The diaphragm or partition; its location and shape; which is such as to make the circulation of steam absolutely positive, and also allow the water of condensation to pass freely under it and directly to the return pipe.

By this Construction

The following results are obtained:

First.—The steam passes in a *spiral course* from the inlet to the outlet of each stack of radiators.

Second.—In no case does the water of condensation flow in an opposite direction to the course of steam.

Third.—The water of condensation, as collected in the end of each radiator, flows under the diaphragm and in a direct line to the outlet.

Fourth.—The steam in its passage *cannot fail* to reach *every part* of the interior of *every section* in the stack, thereby making all equally efficient.

Important Advantages.

First.—Their simplicity; all sections being alike.

Second.—The absolutely positive circulation of steam.

Third.—The freedom of circulation obtained by the large body of steam throughout the interior, and condensation following the course of steam.

Fourth.—The connecting joints are *all threaded, no packing or bolts* being used.

Fifth.—The nipples for the connections are malleable iron with hexagon nut at the center, and are not liable to indentation or damage by a severe strain of tongs or wrench.

Sixth.—Being in sections, they are not liable to injury in transportation, and are in an especially desirable shape to handle and put up.

Seventh.—Every section is tested to *one hundred pounds or upwards cold water pressure*, therefore may be used for either high or low pressure steam heating.

Eighth.—The ease with which a stack may be changed in size, all sections being duplicates; one section may be removed and replaced by another without difficulty.

Ninth.—No assorting is necessary.

Tenth.—The small space they occupy.

Eleventh.—Every section is guaranteed perfect.

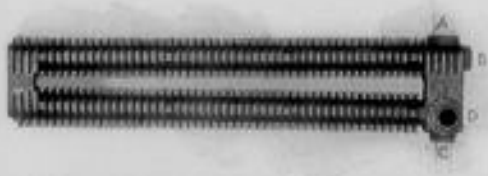
Twelfth.—Using the *best qualities of iron*, the castings produced are fine and smooth.

Directions for Setting.

(*See, also, pages 100 and 101.*)

Hangers of ⅝-inch round iron with gimlet pointed coach screw thread on upper portions, and the lower ends so shaped as to hold iron pipe or bar iron, may be easily screwed into the joists above, and with the nearly horizontal pieces of pipe or iron, make a cheap and substantial support. The front support should be ¼-inch lower than the rear, so that the upper pipe of each Radiator will incline to the rear, and the lower pipe of each will incline to the front. By this arrangement the water of condensation will follow the course of steam throughout each section. The left-hand side of each stack should be from ⅛ to ¼ of an inch lower than the right-hand, so as to allow the water free passage through and out of the stack.

Each stack of Radiators should have, in the warm air chamber, not less than 12 inches clear space above them, and not less than 6 inches below them. The *supply* and *return* pipes should always be of ample size.



Excelsior Indirect Steam Section, showing Special Tappings.

Length of Excelsior Indirect Steam Section, 36 inches; Excelsior Indirect Hot Water Section, 36¼ inches. Height, 8 inches.

Width occupied in stack, 3⅜ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, 4⅛ inches.

Each section contains 12 square feet of heating surface in both Steam and Hot Water.

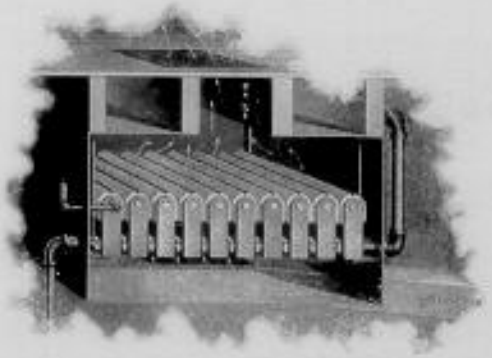
Connected with extra-heavy 1½-inch right and left hand threaded nipples, having hexagon nut at the center.

Regular tapping is 1½-inch; supply tapping has right-hand thread; return tapping, left-hand thread. If smaller than 1½-inch tapping be required for Excelsior Steam Indirect, a 1½-inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.

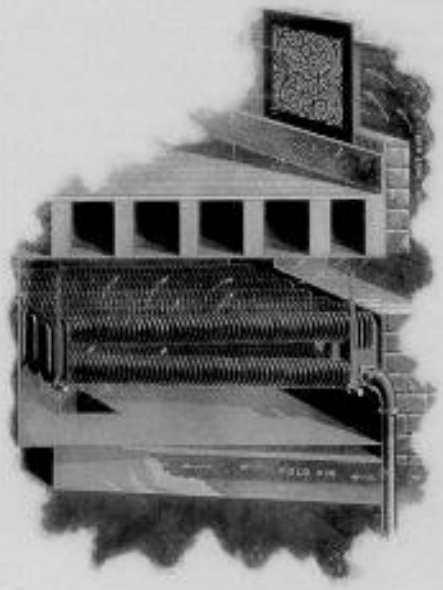
If location of tapping is desired other than regular, we can furnish special tappings as shown above: "A," 1½-inch tapping or smaller; "B," 1¼-inch tapping or smaller; "C," 1¼-inch tapping or smaller; "D," 1¼-inch tapping or smaller.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which sections are to be built, so that necessary vent sections may be shipped.

Excelsior Indirect Hot Water Radiator, Complete Stack.



Excelsior Indirect Radiator.
Showing method of introducing hot air into a room through a register in floor.



Excelsior Indirect Radiator.
Showing method of introducing hot air into a room through a register in the wall.

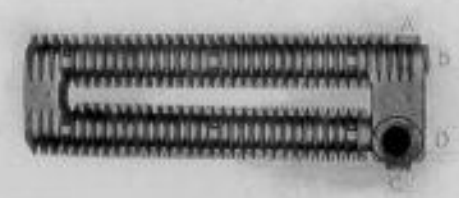
Excelsior Indirect Radiators—Continued.

DATA FOR EXCELSIOR INDIRECT STEAM RADIATORS.

Heating Surface.	Cold Air Supply.	Diameter of Duct if Round.	Hot Air Flue.	Size for Brick Work if Hot Air Flues.	Size of Register.	Ratio of 1 to 30.	Ratio of 1 to 35.	Ratio of 1 to 40.
Sq. Ft.	Sq. In.	Inches.	Sq. In.	Inches.	Inches.	Cu. Ft.	Cu. Ft.	Cu. Ft.
24	36	6.8	48	4 x 12	8 x 8	720	840	960
36	54	8.3	72	8 x 12	9 x 12	1080	1260	1440
48	72	9.6	96	8 x 12	10 x 14	1440	1680	1920
60	90	10.0	120	12 x 12	12 x 15	1800	2100	2400
72	108	11.7	144	12 x 12	12 x 19	2160	2520	2880
84	126	12.7	168	12 x 16	14 x 22	2520	2940	3360
96	144	13.5	192	12 x 16	14 x 24	2880	3360	3840
108	162	14.4	216	12 x 20	16 x 20	3240	3780	4320
120	180	15.2	240	12 x 20	16 x 24	3600	4200	4800
132	198	15.9	264	12 x 24	20 x 20	3960	4620	5280
144	216	16.6	288	12 x 24	20 x 24	4320	5040	5760

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which sections are to be built, so that necessary vent sections may be shipped.

Excelsior Junior Indirect Steam Radiator.



Single Section, Showing Special Tappings.

Each section of Excelsior Junior Indirect Steam Radiator contains 8 square feet of heating surface.

Length of section, 23¼ inches. Height, 8 inches.

Width each section occupies in stack, 3⅜ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, 4½ inches.

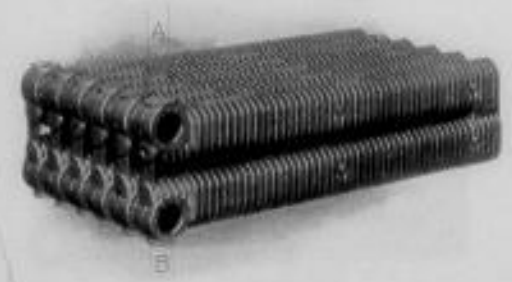
The nipples for connecting sections are extra-heavy 1½ inch, right and left hand threaded, with hexagon nut at the center.

Regular tapping is 1½ inch; supply tapping has right-hand thread; return tapping, left-hand thread. If smaller than 1½-inch tapping be required for Excelsior Junior Steam Indirect, a 1½-inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above cut: "A," 1½-inch tapping or smaller; "B," 1¼-inch tapping or smaller; "C," 1¼-inch tapping or smaller; "D," 1¼-inch tapping or smaller.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which sections are to be built, so that necessary vent sections may be shipped.

Cardinal Indirect Steam or Hot Water Radiators.



Complete Stack.

Patented October 4, 1887; February 26, 1895; April 2, 1895.

Each section of Cardinal Indirect contains 15 square feet of heating surface.

Length of section, 37¼ inches; height, at connecting end, 11¼ inches; at opposite end, 9¼ inches.

Width each section occupies in stack, 3½ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, can be increased to 3⅝ inches or 4⅛ inches.

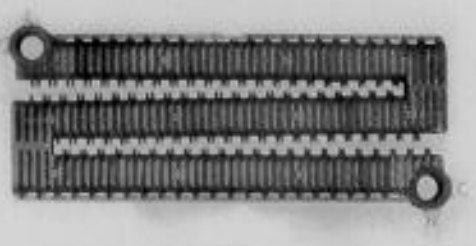
The nipples used for connecting sections are extra-heavy 2-inch, right and left hand threaded, with hexagon nut at the center.

Regular tapping is 2 inches; supply tapping has right-hand thread; return tapping, left-hand thread—unless otherwise ordered.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above illustration: "A," 1½-inch tapping or smaller; "B," 1½-inch tapping or smaller.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which the sections are to be built, so that necessary vent sections may be shipped.

Sterling Indirect
Steam or Hot Water Radiators.



Single Section.

Each section of Sterling Indirect contains 20 square feet of heating surface.

Length of section, 37 inches; height, 16 inches.

Width each section occupies in stack, 3½ inches; or, when specially ordered, this can be increased to 4 inches, by using extra-long nipples, to give additional air area between sections.

The nipples used for connecting sections are extra-heavy 2-inch, right and left hand threaded, with hexagon nut at the center.

Unless otherwise ordered, Sterling Indirects are tapped 2 inches; supply tapping has right-hand thread, return tapping, left-hand thread.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above illustration at "E," "F," "G" or "H," 1½ inches or smaller.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which the sections are to be built, so that necessary supply and return sections may be shipped.

ALL RADIATORS

Illustrated on pages 105 to 144, inclusive, are manufactured at our

MICHIGAN PLANT,

Detroit, Mich.

Perfection Direct Steam Radiators.
45, 38, 32, 26, 23 and 20 in. Heights.
See page 107.

Perfection and Perfection Wide Top Direct Steam Radiators.

LIST OF SIZES.

No. of Sections.	*Length. 2½ in. per Sec	HEATING SURFACE—SQUARE FEET.					
		45-in. Height. 5 Sq. Ft. per Sec.	38-in. Height. 4 Sq. Ft. per Sec.	32-in. Height. 3½ Sq. Ft. per Sec.	26-in. Height. 2½ Sq. Ft. per Sec.	23-in. Height. 2½ Sq. Ft. per Sec.	20-in. Height. 2 Sq. Ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64

Unless otherwise ordered, the above Steam Radiators will be tapped 2 inches, and bushed in accordance with list on page 137. For list of *special tappings*, see page 139.

Each section is 7½ inches wide. Width of legs, 9½ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at bottom with extra heavy 2-inch, right and left hand threaded nipples.

Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 2 inches return.

*In estimating *length* of Radiator, *allow ¼ inch* for each bushing.

Perfection Direct Steam Radiators.

See page 107.

Perfection Direct Hot Water Radiator.

See page 111.

Perfection Wide Top Direct Hot Water Radiator.

Made in Steam and Hot Water on special order only, and in heights and of dimensions shown on pages 107 and 111.

Perfection and Perfection Wide Top Direct Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET.				
		45-in. Height. 5 Sq. Ft. per Sec.	38-in. Height. 4 Sq. Ft. per Sec.	32-in. Height. 3⅓ Sq. Ft. per Sec.	26-in. Height. 2⅔ Sq. Ft. per Sec.	20-in. Height. 2 Sq. Ft. per Sec.
2	5	10	8	6⅔	5⅓	4
3	7½	15	12	10	8	6
4	10	20	16	13⅓	10⅔	8
5	12½	25	20	16⅔	13⅓	10
6	15	30	24	20	16	12
7	17½	35	28	23⅓	18⅔	14
8	20	40	32	26⅔	21⅓	16
9	22½	45	36	30	24	18
10	25	50	40	33⅓	26⅔	20
11	27½	55	44	36⅔	29⅓	22
12	30	60	48	40	32	24
13	32½	65	52	43⅓	34⅔	26
14	35	70	56	46⅔	37⅓	28
15	37½	75	60	50	40	30
16	40	80	64	53⅓	42⅔	32
17	42½	85	68	56⅔	45⅓	34
18	45	90	72	60	48	36
19	47½	95	76	63⅓	50⅔	38
20	50	100	80	66⅔	53⅓	40
21	52½	105	84	70	56	42
22	55	110	88	73⅓	58⅔	44
23	57½	115	92	76⅔	61⅓	46
24	60	120	96	80	64	48
25	62½	125	100	83⅓	66⅔	50
26	65	130	104	86⅔	69⅓	52
27	67½	135	108	90	72	54
28	70	140	112	93⅓	74⅔	56
29	72½	145	116	96⅔	77⅓	58
30	75	150	120	100	80	60
31	77½	155	124	103⅓	82⅔	62
32	80	160	128	106⅔	85⅓	64

Unless otherwise ordered, the above Hot Water Radiators are tapped 2 inches, and finished in accordance with list on page 137. For list of *Special tappings*, see page 139.

Each section is 7¼ inches wide. Width of legs, 9¼ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra heavy right and left hand threaded nipples, 2½ inches at top and bottom.

Top of each Perfection Hot Water leg section has 1¼ inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of either supply or return tapping for Hot Water is 4½ inches.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Rococo Direct Hot Water Radiator.

See page 113.

Rococo Direct Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2½ inches per Sec.	HEATING SURFACE, Square Feet.
		38-in. Height, 2 Sq. Ft. per Section.
2	5	10
3	7½	15
4	10	20
5	12½	25
6	15	30
7	17½	35
8	20	40
9	22½	45
10	25	50
11	27½	55
12	30	60
13	32½	65
14	35	70
15	37½	75
16	40	80
17	42½	85
18	45	90
19	47½	95
20	50	100
21	52½	105
22	55	110
23	57½	115
24	60	120
25	62½	125
26	65	130
27	67½	135
28	70	140
29	72½	145
30	75	150
31	77½	155
32	80	160

Unless otherwise ordered, the Rococo Radiators are tapped 2 inches, and bushed according to list on page 137. For list of *special tappings*, see page 139.

Each section is 10 inches wide. Width of legs, 10½ inches.

All openings will have right-hand threads, unless otherwise ordered.

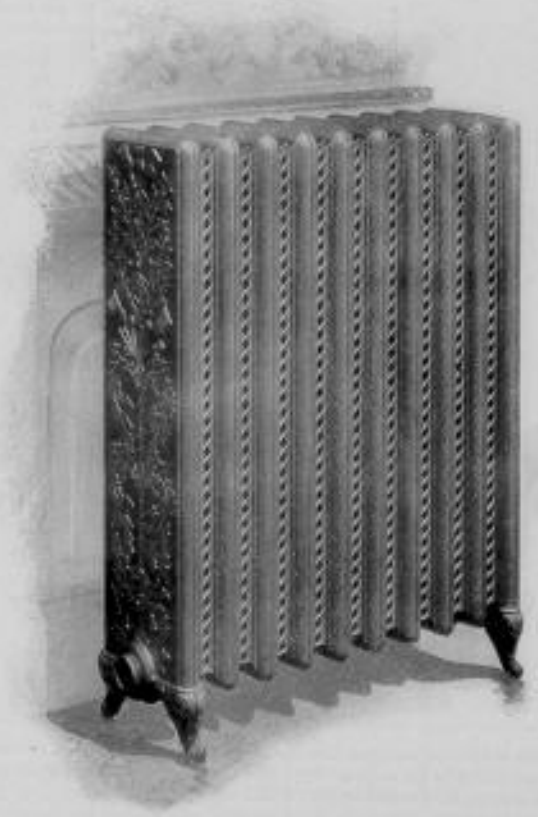
Connected at top and bottom with extra-heavy right and left hand threaded 2-inch nipples.

Top of each leg section has 2-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of either supply or return tapping is 4½ inches.

NOTE.—For other than 38-in. Height, see pages 20 and 21.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.



Monarch Flue Steam Radiator.

See page 115.

Monarch Flue Steam Radiator.

LIST OF SIZES.

No. of Sections	*Length, 3 inches per Sec.	HEATING SURFACE — SQUARE FEET.				
		38 in. Height. 9½ Sq. Ft. per Sec.	31 in. Height. 8 Sq. Ft. per Sec.	26 in. Height. 6 Sq. Ft. per Sec.	23 in. Height. 5 Sq. Ft. per Sec.	16, 15 and 14 in. Heights. 3½ Sq. Ft. per Sec.
2	6	19	16	12	10	6⅔
3	9	28½	24	18	15	10
4	12	38	32	24	20	13⅓
5	15	47½	40	30	25	16⅔
6	18	57	48	36	30	20
7	21	66½	56	42	35	23⅓
8	24	76	64	48	40	26⅔
9	27	85½	72	54	45	30
10	30	95	80	60	50	33⅓
11	33	104½	88	66	55	36⅔
12	36	114	96	72	60	40
13	39	123½	104	78	65	43⅓
14	42	133	112	84	70	46⅔
15	45	142½	120	90	75	50
16	48	152	128	96	80	53⅓
17	51	161½	136	102	85	56⅔
18	54	171	144	108	90	60
19	57	180½	152	114	95	63⅓
20	60	190	160	120	100	66⅔

Unless otherwise ordered, Monarch Flue Steam Radiators are tapped 2 inches, and bushed according to list on page 137. For list of *special tappings*, see page 139.

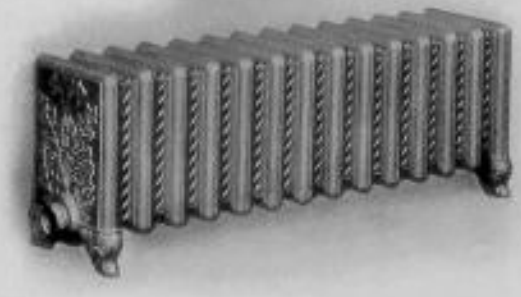
Each section is 10¾ inches wide. Width of legs, 11¾ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at bottom with extra-heavy 2-inch, right and left hand threaded nipples.

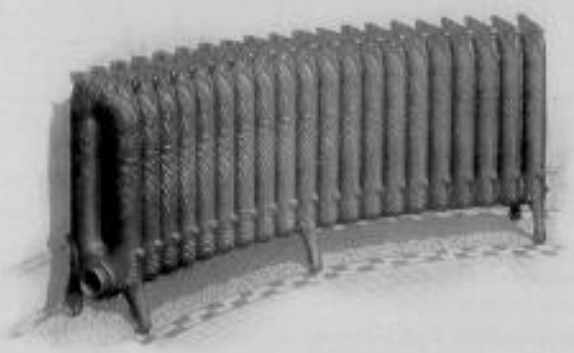
Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return.

*In estimating *length* of Radiator, *allow ¾ inch* for each bushing.



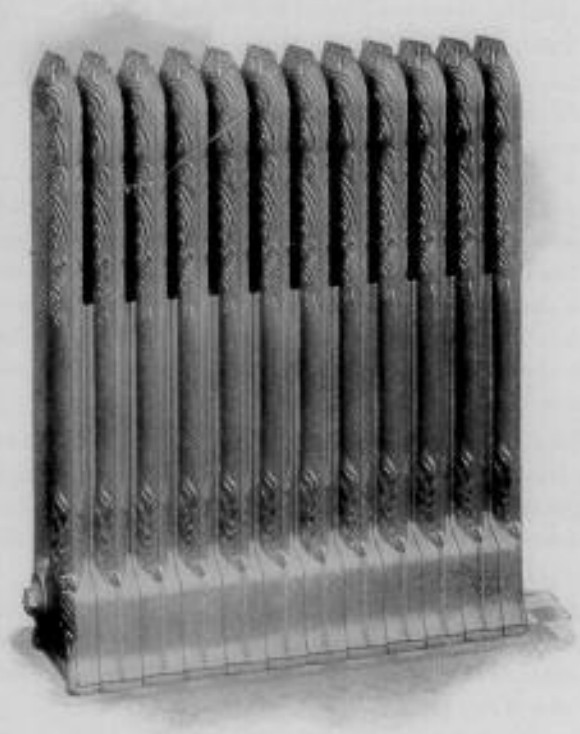
Monarch Flue Steam Radiator.

See page 115.



Perfection Wide Top Curved Radiator.

See page 127.



Perfection Direct-Indirect Radiator.

(Patented June 24, 1890.)

See pages 118 and 119.

Direct-Indirect Radiators

Are made at our MICHIGAN PLANT in 45, 38 and 26 in. Heights of Perfection Steam and 38-in. Height of Perfection Hot Water; also, in 38-in. Height of Rococo Hot Water.*

The lower portion of each section or loop of the radiator has flanges cast on each side, and, when the sections are connected, the flanges dove-tail together and form large, perpendicular, fresh-air flues between the sections. A damper door is placed at either end of base, and if desired, when cold air supply is shut off by means of a register in air duct, the radiator can be converted into the ordinary direct type by opening both damper doors, thus taking the air from the room instead of the outside. The damper doors also make it possible to easily clean the base of any accumulation of dust and dirt. Can also furnish with opening at back so air conduit may be brought into radiator above floor level, instead of under base of radiator through floor.

For dimensions and heating surfaces of Perfection Steam and Hot Water Direct-Indirect Radiators, see page 119. Heights of flanges on the Perfection Steam and Hot Water Direct-Indirect Radiators are as follows: 45-in. Height, 27 inches; 38 in. Height, 22¼ inches; 26-in. Height, 17¾ inches.

Dimensions and heating surface of 38-in. Height Rococo Hot Water Direct-Indirect Radiators are shown on page 113. Height of flanges on the 38-in. Height Rococo Hot Water Direct-Indirect Radiator is 19⅛ inches.

If back opening is required, it will be necessary to know whether supply tapping is to be at right or left hand as you face the front of Radiator.

For Floor Dampers to fit under Perfection and Rococo Direct-Indirect Radiators, see page 121. For Wall Boxes, see page 34.

*For other than 38-in. Height of Rococo Hot Water Direct-Indirect Radiators, see pages 27 and 29.

Perfection Direct-Indirect Steam and Hot Water Radiators.

LIST OF SIZES.

No. of Sections.	*Length, 2⅛ inches per Sec.	HEATING SURFACE—SQUARE FEET. 45-in. Height. 2 Sq. Ft. per Sec.	38-in. Height. 1⅔ Sq. Ft. per Sec.	26-in. Height. 1⅓ Sq. Ft. per Sec.
2	5¼	10	8	5⅓
3	7⅜	15	12	8
4	10½	20	16	10⅔
5	13⅝	25	20	13⅓
6	15¾	30	24	16
7	18⅛	35	28	18⅔
8	21	40	32	21⅓
9	23⅝	45	36	24
10	26¼	50	40	26⅔
11	28⅞	55	44	29⅓
12	31½	60	48	32
13	34⅛	65	52	34⅔
14	36¾	70	56	37⅓
15	39⅜	75	60	40
16	42	80	64	42⅔
17	44⅜	85	68	45⅓
18	47¼	90	72	48
19	49⅞	95	76	50⅔
20	52½	100	80	53⅓
21	55¼	105	84	56
22	57¾	110	88	58⅔
23	60⅜	115	92	61⅓
24	63	120	96	64
25	65⅝	125	100	66⅔
26	68¼	130	104	69⅓
27	70⅞	135	108	72
28	73½	140	112	74⅔
29	76¼	145	116	77⅓
30	78¾	150	120	80
31	81⅜	155	124	82⅔
32	84	160	128	85⅓

The Perfection Direct-Indirect Radiator for Hot Water is made only in 38 inch Height.

The Perfection Radiator is tapped 2 inches in Steam, 1¼ inches in Hot Water, and, unless otherwise ordered, will be bushed according to list on page 137. For list of *special tappings*, see page 139.

Each section is 7⅛ inches wide. Width of legs, 9¾ inches.

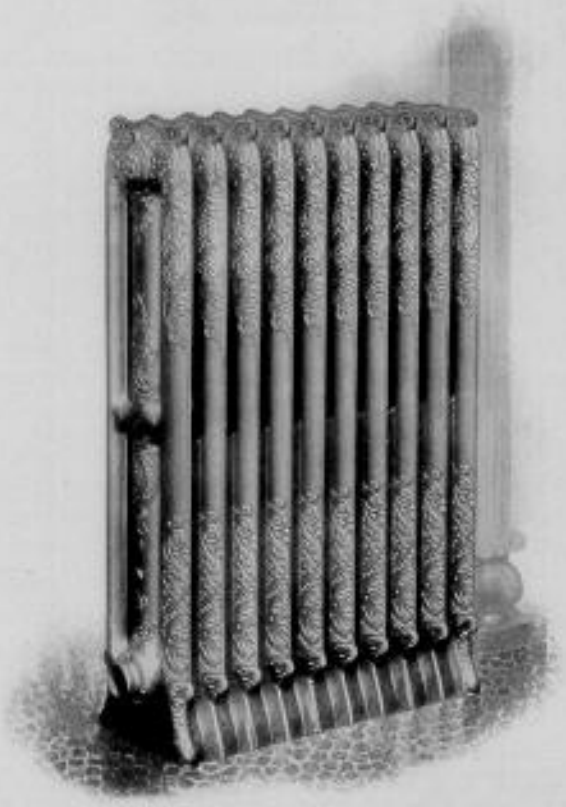
All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot Water, 1¼ inches at top and bottom.

Top of each Hot Water leg section has ⅛-inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of tapping; single pipe Steam, 2 inches; double pipe Steam, 4½ inches supply, 2 inches return; Hot Water, supply and return, 4½ inches.

*In estimating *length* of Radiator, *allow ⅛ inch* for each bushing.



Rococo Direct-Indirect Hot Water Radiator.

(Patented June 24, 1890.)

See page 118.

Floor Dampers.

For Perfection and Rococo Direct-Indirect Radiators.

Size No.	Length, Inches.	To Fit Under.	Air Area, Square Inches.
4	8¼	4 and 5 Sec. Radiators . .	12
5	11	6, 7 and 8 Sec. Radiators .	20
9	21½	9 and 10 Sec. Radiators . .	47
10	24	11 and 12 Sec. Radiators . .	54
12	29¾	13 and 14 Sec. Radiators . .	67
15	37	15, 16 and 17 Sec. Radiators .	88
18	44¼	18, 19 and 20 Sec. Radiators .	108
20	50	21 to 30 Sec. Radiators . .	122

All 8¼ inches wide

The above Floor Damper is made to set flush, in floor, directly under Radiator. The handle shown in cut projects through the slot in damper door of Radiator, making it possible to introduce or shut off the cold air supply to meet the varying heating and ventilating requirements of the room.

Perfection Dining Room Radiator, No. 2.

See page 123.

Perfection Dining Room Steam or Hot Water Radiators.

MADE IN 38-INCH HEIGHT ONLY.

Perfection Dining Room Radiators are an indispensable convenience to any well-appointed dining room, serving as a dish or food warmer. The construction is such as to form a continuous steam or hot water chamber around the entire closet. The upper portion of the closet, with double doors, when open, discloses two shelves, 20¼ inches long, 13 inches wide, with 9 inches space between each. The lower portion of the closet, with drop door, has one shelf the same size as those in the upper portion, and when the door is dropped forms a very convenient rest or shelf in addition to the shelf in the oven.

LIST OF SIZES.

Number.	*Length, Inches.	Heating Surface, Square Feet.
00	25	13
0	30	21
1	35	29
2	40	37
3	45	45
4	50	53
5	55	61
6	60	69
7	65	77

Unless otherwise ordered, Perfection Dining Room Radiators are tapped 1¼ inch, and bushed in accordance with list on page 137. For list of *special tappings*, see page 139.

Distance from floor to center of either supply or return tapping is 4½ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected with right and left hand threaded extra-heavy nipples, 1½ inches at top and bottom.

Top of each leg has 1½ inch plug, which can be taken out to make top connection when desired.

The outside width of oven is 13¾ inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than 6⅛ inches.

*In estimating *length* of Radiator, *allow* ½ *inch* for each bushing.

Perfection Wide Top Circular Radiator.

See page 125.

Perfection and Perfection Wide Top Circular Steam and Hot Water Radiators.

LIST OF SIZES.

No. Sections.	Outside Diameter at Legs. Inches.	Inside Diameter at Legs. Inches.
16	25½	6½
18	27	8
20	28½	9½
24	32	13
26	32½	13½
28	33½	14½
30	33½	14½
34	38⅝	19⅝
40	41½	22½
44	43½	24½
60	55	36

Perfection and Perfection Wide Top Circular Radiators are made in 45, 38, 32, 26 and 20 in. Heights Hot Water, and in 45, 38, 32, 26, 23 and 20 in. Steam.

Perfection and Perfection Wide Top Circular Radiators are made in halves — each half requires independent pipe connection, as shown in cut. (See Note.)

For two pipe work, the return valves would be on the opposite side of the radiator. Unless otherwise ordered, Circular Radiators are tapped supply in front, return at back — both halves.

These radiators are tapped 2 inches in Steam, 1½ inches in Hot Water, and, unless otherwise ordered, will be bushed in accordance with list on page 137.

For list of *special tappings*, see page 139.

All openings will have right-hand threads unless otherwise ordered.

Distance from floor to center of either supply or return tapping in Perfection or Perfection Wide Top Circular Radiators is 4 inches.

All Perfection Circular Steam Radiators connected with extra-heavy right and left hand threaded 2-inch nipples; Perfection Circular Hot Water Radiators connected at both top and bottom with 1½-inch extra-heavy right and left hand threaded nipples.

NOTE.— Circular Radiators can be made to work as one radiator, single pipe system, by use of elbows and tee.

Perfection Wide Top Corner Radiator.

See page 127.

Curved and Corner Radiators

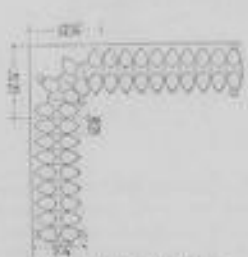
Are made at MICHIGAN PLANT in all heights and styles of Perfection and Perfection Wide Top, Steam and Hot Water, and Monarch Flue for Steam only, and of any desired radius or angle.

In ordering Curved and Corner or Angle Radiators, specify the exact radius or angle of the baseboard at floor within which the radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 149, 150 and 151.

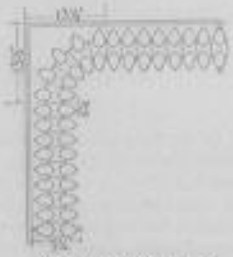
In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tappings from floor, we must know (by sketch) which end of radiator is for supply and which for return, as you face the inside of angle or curve.

In estimating *length* of Radiators, *allow ½ inch* for each bushing.

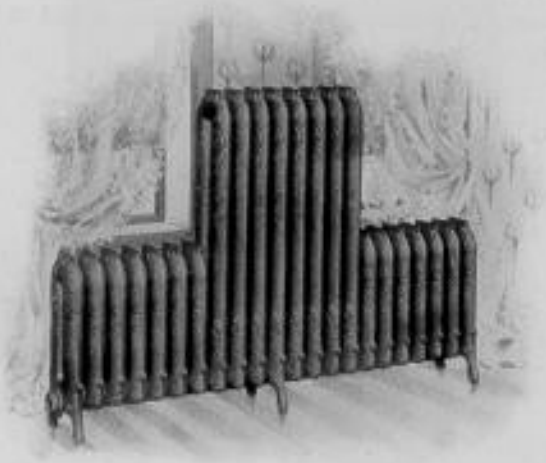
MEASUREMENTS FOR
Monarch Flue Corner Radiators,
for Steam only.
(3 sections to make corner.)
For heights and heating surfaces of sections, see page 113.



MEASUREMENTS FOR
Perfection and Perfection Wide Top
Corner Radiators,
for Steam and Hot Water.
(4 sections to make corner.)
For heights and heating surfaces of sections, see pages 107 and 111.



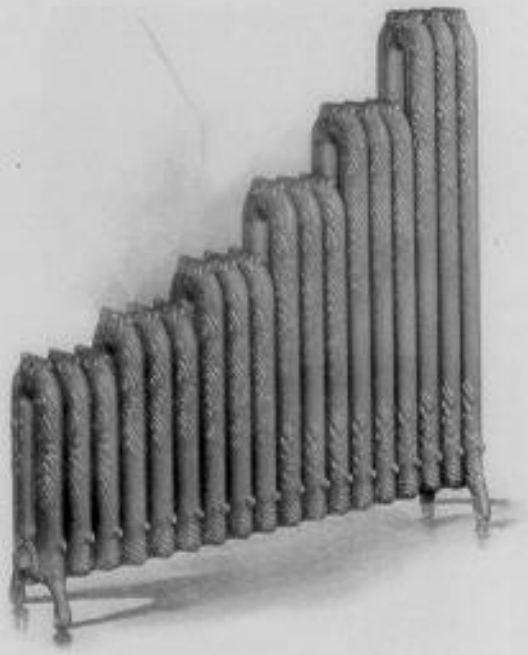
MEASUREMENTS FOR
Perfection and Perfection Wide Top
Corner Radiators,
for Steam and Hot Water.
(3 sections to make corner.)
For heights and heating surfaces of sections, see pages 107 and 111.



Perfection Direct Steam Window Radiator.

Made in all heights of Perfection and Perfection Wide Top Steam and Hot Water Radiators, and in sizes to suit the requirements of any window.

For heights, heating surfaces and dimensions of sections, see pages 107 and 111.



Perfection Direct Steam Stairway Radiator.

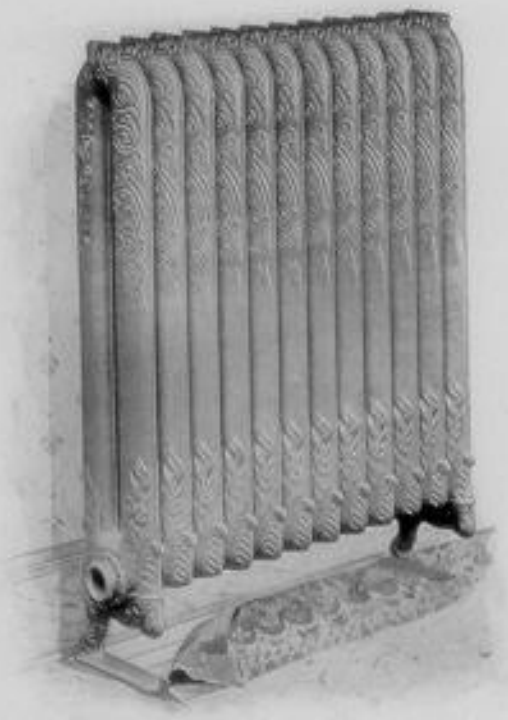
Made in Perfection, Perfection Wide Top and Monarch Flue, for Steam only, and in sizes to suit any pitch of stairway.

For heights, heating surfaces and dimensions of sections, see pages 107 and 115.

Perfection Direct Steam Radiator,

EQUIPPED WITH DETACHABLE HIGH LEGS.

See page 140.



Perfection Direct Steam Radiator,

EQUIPPED WITH DETACHABLE CARPET FEET

(Patent applied for.)

See page 140.

Perfection Direct Hot Water Radiator,

EQUIPPED WITH SPECIAL CAST-IRON TOP.

Special Cast-iron Tops are made to fit all heights of Perfection Direct Steam and Hot Water Radiators, as shown on pages 107 and 111.
When ordering Tops only, state whether for Steam or Hot Water Radiators.

Perfection Wide Top Direct Steam Radiator,

EQUIPPED WITH MARBLE TOP.

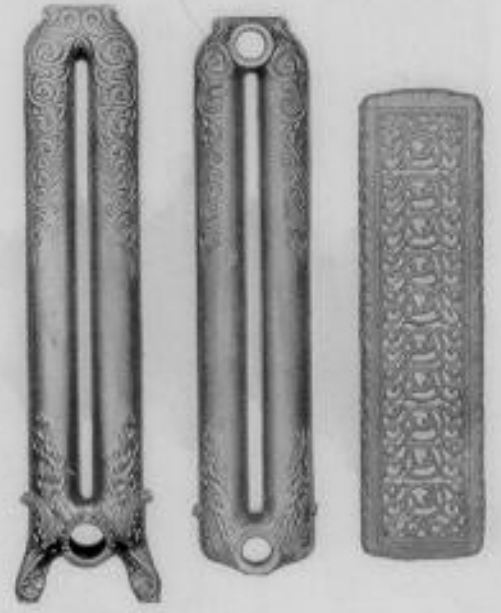
We can furnish any and all Radiators made at MICHIGAN PLANT with lugs cast on top of sections, so marble tops may be fitted to them.

A B C

A—Perfection Steam leg section, showing detachable high leg and stub, . . see pages 130 and 140.

B—Perfection Steam leg section, with both supply and return tappings at bottom, ... see page 139.

C—Perfection Steam leg section, with detachable Carpet Foot, ... see pages 131 and 139.



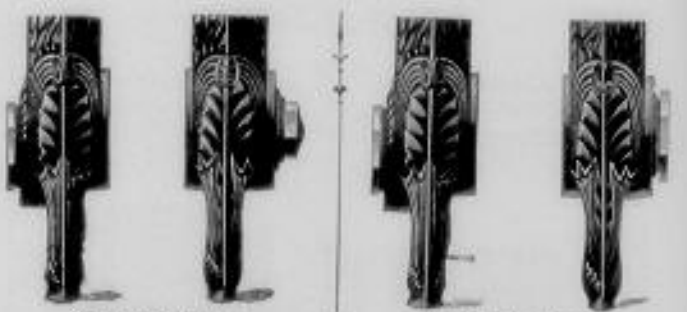
A B C

A—Perfection Steam leg section, ... see page 108.

B—Perfection Hot Water intermediate section, . . " " 109.

C—Perfection Cast-iron Top, ... " " 132.

American Radiator Bushing System.



Single Pipe Steam.

Distance from Floor to Center of Tapping is 4 inches.*

Double Pipe Steam.

Distance from Floor to Center of Supply Tapping is 4½ inches, return, 4 inches.*

In Hot Water Radiators, distance from floor to center of either supply or return tapping is 4¼ inches.*

Very often it is found necessary to change the tapping of Radiators after they are ordered and placed in buildings. The system illustrated here renders it very easy to make alterations without redrilling or retapping, by the use of Bushings. Above cuts represent the Perfection pattern.

Double tapping can be changed to single tapping by use of plug in supply end, and single to double by replacing plug with bushing for the supply connection.

Both supply and return legs have air valve tappings with interchangeable plug.

In ordering end sections, specify whether supply or return tapping; also, whether for single or double pipe work, as shown above.

For Detachable High Legs and Pedestals, to increase distance from floor to center of tapping to any height desired, see page 140.

*These measurements do not apply to Direct Steam Radiators with supply and return tappings at bottom of same end (see page 139); Perfection Circular (see page 125); nor to Perfection Carpet Feet Radiators (see page 140).

Special Tappings.

Air Valve Tappings.— Both supply and return legs have air valve tappings, with interchangeable plugs. All air valve tappings are regularly made ⅜ inch, but when specially ordered they can be furnished ¼ inch.

Tappings for Supply and Return at Bottom of Same End, for Steam.— This style of tapping, as shown on page 134, can be furnished in all heights of Perfection and Perfection Wide Top Steam Radiators. Both tappings are 2 inches, and bushed according to list on page 137. Distance between centers of tappings is 3⅜ inches; distance from floor to center of either tapping is 3¾ inches.

Supply tapping can be made at either right or left hand, as you face tappings, by merely changing location of bushings.

Tappings for Top Feed and Bottom Return at Same End.— Top of each leg section in all styles and heights of Perfection Hot Water Radiators made at Michigan Plant has 1½-in. plug. Rococo Hot Water has 2-in. plug, which can be taken out to make top connections, when desired.

In Perfection and Perfection Wide Top Hot Water Radiators, the distance between centers of upper and lower tappings is — in the 45-in. Height, 39⅞ inches; 38-in. Height, 31¾ inches; 32-in. Height, 26 inches; 26-in. Height, 20¾ inches; 20-in. Height, 14¼ inches.

In Rococo Hot Water Radiator, 38-in. Height, as made at Michigan Plant, the distance between centers of upper and lower tappings is 31 inches.

Tappings at Extreme Top or Bottom of First or Second Section of Stack — When so ordered, can place special tapping of 1¼ inch or smaller at extreme top of first or second section or at bottom of second section of stack in any pattern made at Michigan Plant, except Rococo Water Radiator, which can be tapped 1½ inch.

Detachable High Legs

(Patent applied for)

As shown on pages 130 and 134, are made, upon special order, for all heights of Perfection, Perfection Wide Top, and Rococo Direct Radiators manufactured at MICHIGAN PLANT. They can be furnished in any height desired, so that center of supply tapping will be 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½ or 10 inches from floor.

All Monarch Flue Radiators are regularly equipped with detachable legs, as shown on page 136, and can be furnished in any height desired, so that center of supply tapping will be 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½ or 8 inches from floor.

These legs are detached and shipped separately, thus removing possibility of breakage.

In ordering radiators having detachable legs, always give distance from floor to center of what is to be the supply tapping of radiator; and when for steam, be sure to state whether for one or two pipe job.

Detachable Carpet Feet

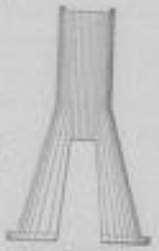
(Patent applied for)

As shown on pages 131 and 134, form a pleasing convenience for sweeping out under the radiator, and avoid the necessity of lifting the radiator to slip carpet under the feet or legs, or else cutting the carpet to fit around them. They can be furnished for all heights of Perfection Steam and Hot Water Radiators, as shown on pages 107 and 111. Carpet Feet increase distance from floor to center of supply tapping to 6½ inches, for single pipe Steam; supply 7 inches, return 6½ inches, for double pipe Steam; 7 inches, either supply or return, for Hot Water. The Carpet Feet are shipped in box separately to insure reaching destination safely.

Pedestals

To fit under legs of all styles and heights of Direct Radiators can be furnished in following heights: ½, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½ and 9 inches.

1-in. Pedestal.



9-in. Pedestal.

Specialties.

We make the following special shapes of Radiators at our MICHIGAN PLANT:

PERFECTION—

Circular for Steam and Hot Water,	see page 125.
Curved " "	" 127.
Corner " "	" 127.
Direct-Indirect for Steam and Hot Water,	" 117, 118, 119.
Window for Steam and Hot Water,	" 128.
Stairway for Steam only,	" 129.
Marble Top, arranged with Lugs for Steam and Hot Water,	" 133.
Equipped with Carpet Feet, Steam and Hot Water,	" 131, 134, 140.
Equipped with Cast-iron Top, for Steam and Hot Water,	" 132, 135.

PERFECTION WIDE TOP—

Circular for Steam and Hot Water,	see pages 124, 125.
Curved " "	" 116, 127.
Corner " "	" 126, 127.
Direct-Indirect for Steam and Hot Water,	" 118, 119.
Window for Steam and Hot Water,	" 128.
Stairway for Steam only,	" 129
Marble Top, arranged with Lugs for Steam and Hot Water,	" 133.
Equipped with Carpet Feet, for Steam and Hot Water,	" 131, 134, 140.

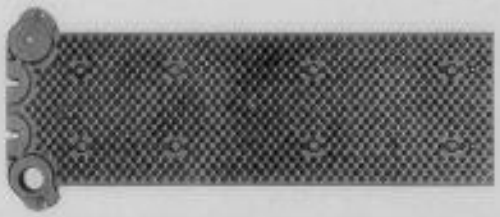
ROCOCO—

Marble Top, arranged with Lugs for Hot Water,	see page 133.
Direct-Indirect for Hot Water,	" 118, 120.

MONARCH FLUE—

Curved for Steam only,	see page 127.
Corner " "	" 127.
Stairway " "	" 129.
Marble Top, arranged with Lugs for Steam only,	" 133.

Perfection Pin Indirect Steam or Hot Water Radiators.



Extra Large Size Section with Bolt and Flange Connection.

We desire to call attention to a few claims we herewith present, regarding the increased efficiency and superior construction of our "Perfection" over other makes of Pin Radiators, which renders it possible to erect with great saving of labor and with absolute certainty of tight joints.

Connection is made 1¾ inches in diameter in both the top and bottom, securing a better circulation for Steam, and, without extra cost, it can be used for Hot Water.

The sections at point of contact are faced absolutely true and smooth by our improved special machinery, in addition to which we furnish a simple Manilla Paper Washer, and when the sections are drawn together by our method of bolts, the joints are rendered positively tight. Three short bolts are used with each section, as shown in cut, and being in line with one another, gives no chance for the joint to spring, as is often the case with the old style Pin Radiator having only two bolts. In addition to its making the joint simpler and more secure, this system renders it very much easier to alter the size of the stack after it is suspended on the hangers, and any section can be removed by simply unscrewing the bolts, which are easily reached by removing one end of the casing.

Having decreased the size and increased the number of Pins over three hundred, and having added 1 inch to the width, allowing liberal area for air passage between the sections, it is at once apparent that the air passes over more and hotter surface than on the old style. The Pins being smaller, the extended surface is brought closer to the cored surface, vastly increasing the heating capacity of the section.

Made in two sizes, "Standard" and "Extra Large." The latter is particularly effective for hot water heating, as the air passing over so large an area of surface is thoroughly warmed before being conducted to the room to be heated.

For dimensions and tappings, see pages 143 and 144.

Perfection Pin Indirect Steam or Hot Water Radiators.

WITH BOLT AND FLANGE CONNECTIONS.

"Standard" Size, Single Section.

Each section of Perfection Pin Indirect "Standard" size contains 10 square feet of heating surface. Length, 36 inches. Height, 7¾ inches. Height at connecting point, 11⅝ inches. Width each section occupies in stack, 2¾ inches; or, when specially ordered, this can be increased ⅛ inch or more, to give additional air area between sections, by furnishing sections with extra heavy bosses.

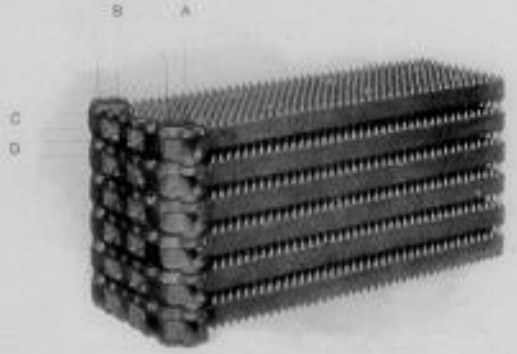
Each section of Perfection Pin Indirect "Extra Large" size, contains 15 square feet of heating surface. Length, 36 inches. Height, 11½ inches. Height at connecting point, 15⅝ inches. Width each section occupies in stack, 2⅞ inches; or, when specially ordered, this can be increased ⅛ inch or more, to give additional air area between sections, by furnishing sections with extra heavy bosses.

Both "Standard" and "Extra Large" sizes are tapped 2 inches, and, unless otherwise ordered, will be bushed according to list on page 137.

All openings will have right-hand threads, unless otherwise ordered.

If location of tapping is desired other than regular, as shown by "A" in cut, we can furnish special tapping at "B," 2 inches or smaller; "C," 1¼ inches or smaller; "D," 1¼ inches or smaller. Can also furnish same special tappings at reverse end of stack, if desired.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be careful to specify the size of stacks into which the sections are to be built, that provision may be made for supply and return and for sending proper number of threaded end sections.



Complete Stack, "Extra Large" Size.

Perfection Pin Indirect Steam or Hot Water Radiators.

WITH RIGHT AND LEFT HAND THREADED NIPPLE CONNECTIONS.

"Standard" Size, Single Section.

Each section of Perfection Pin Indirect "Standard" size, with right and left hand threaded nipple connections, contains 10 square feet of heating surface. Length, 36 inches. Height, 7⅝ inches. Height at connecting point, 11⅛ inches. Width each section occupies in stack, 2¼ inches; or, when specially ordered, this can be increased ½ inch or more, to give additional air area between sections, by furnishing extra long nipples.

Each section of Perfection Pin Indirect "Extra Large" size, with right and left hand threaded nipple connections, contains 15 square feet of heating surface. Length, 36 inches. Height, 11⅛ inches. Height at connecting point, 15⅛ inches. Width each section occupies in stack, 2¾ inches; or, when specially ordered, this can be increased ⅜ inch or more, to give additional air area between sections, by furnishing extra long nipples.

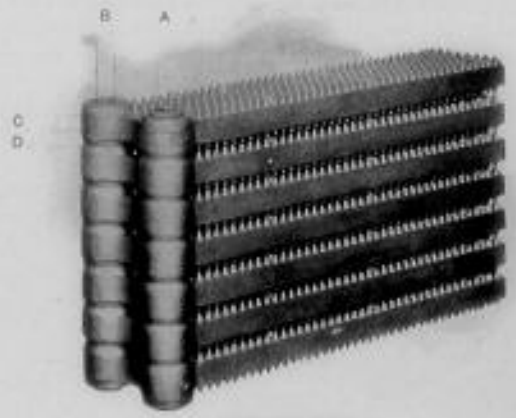
Both "Standard" and "Extra Large" sizes are tapped 2 inches, and unless otherwise ordered will be bushed in accordance with list on page 147.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy 2-inch right and left hand threaded nipples.

If location of tapping is desired other than regular, as shown by "A" in cut, we can furnish special tapping at "B," 2 inches or smaller; "C," 1¼ inches or smaller; "D," 1¼ inches or smaller. These Indirects can also be furnished with same special tappings at reverse end of stack, if desired.

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be careful to specify the size of stacks into which the sections are to be built, that necessary supply and return sections may be sent.



Complete Stack.

List of Patterns Made in Various Heights.*

43-IN. HEIGHT:	Perfection, Perfection Wide Top, National, Ideal and Peerless, Steam,	5 sq. ft. per sec.
	Perfection, Perfection Wide Top, National and Peerless, Hot Water,	5 sq. ft. per sec.
	Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, Steam and Hot Water,	5¼ sq. ft. per sec.
44-IN. HEIGHT:	Rococo, Steam and Hot Water,	6 sq. ft. per sec.
39½-IN. HEIGHT:	Italian Flue Box Base, Steam and Hot Water,	7 sq. ft. per sec.
38-IN. HEIGHT:	National Single Column, Steam and Hot Water,	3 sq. ft. per sec.
	Verona, Perfection, Perfection Wide Top, National, Ideal, Peerless and Excelsior, Steam,	4 sq. ft. per sec.
	Verona, Perfection, Perfection Wide Top, National and Peerless, Hot Water,	4 sq. ft. per sec.
	Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, Steam and Hot Water,	4½ sq. ft. per sec.
	Rococo, Steam and Hot Water,	5 sq. ft. per sec.
	Italian Flue, Steam and Hot Water,	7 sq. ft. per sec.
	National Four Column, Hot Water or Steam,	8 sq. ft. per sec.
	Monarch Flue, Steam,	9½ sq. ft. per sec.
33½-IN. HEIGHT:	Italian Flue Box Base, Steam and Hot Water,	5¾ sq. ft. per sec.
32-IN. HEIGHT:	National Single Column, Steam and Hot Water,	2½ sq. ft. per sec.
	Verona, Perfection, Perfection Wide Top, National, Ideal and Peerless, Steam,	3½ sq. ft. per sec.
	Verona, Perfection, Perfection Wide Top, National and Peerless, Hot Water,	3½ sq. ft. per sec.

*See page 147.

List of Patterns Made in Various Heights*— Continued.

32-IN. HEIGHT — *Continued.*

Rococo, Steam and Hot Water,	4⅕ sq. ft. per sec.
Italian Flue, Steam and Hot Water,	5¼ sq. ft. per sec.
National Four Column, Steam or Hot Water,	6⅗ sq. ft. per sec.
Monarch Flue, Steam,	8 sq. ft. per sec.
31-IN. HEIGHT: Excelsior, Steam,	3⅕ sq. ft. per sec.
Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, Steam and Hot Water,	3½ sq. ft. per sec.
27½-IN. HEIGHT: Italian Flue Box Base, Steam and Hot Water,	4½ sq. ft. per sec.
26-IN. HEIGHT: National Single Column, Steam and Hot Water,	2 sq. ft. per sec.
Verona, Perfection, Perfection Wide Top, National, Ideal and Peerless, Steam,	2⅗ sq. ft. per sec.
Verona, Perfection, Perfection Wide Top, National and Peerless, Hot Water,	2⅘ sq. ft. per sec.
Rococo, Steam and Hot Water,	3¾ sq. ft. per sec.
Italian Flue, Steam and Hot Water,	4½ sq. ft. per sec.
National Four Column, Steam or Hot Water,	5⅕ sq. ft. per sec.
Monarch Flue, Steam,	6 sq. ft. per sec.
25-IN. HEIGHT: Excelsior, Steam,	2⅗ sq. ft. per sec.
Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, Steam and Hot Water,	2⅘ sq. ft. per sec.
23-IN. HEIGHT: National Single Column, Steam and Hot Water,	1⅗ sq. ft. per sec.
Perfection, Perfection Wide Top, National, Ideal and Peerless, Steam,	2⅕ sq. ft. per sec.
National and Peerless, Hot Water,	2⅕ sq. ft. per sec.

*See page 147.

List of Patterns Made in Various Heights*— Continued.

23-IN. HEIGHT — *Continued.*

National Four Column, Steam or Hot Water,	4⅘ sq. ft. per sec.
Monarch Flue, Steam,	5 sq. ft. per sec.
21½-IN. HEIGHT: Italian Flue Box Base, Steam and Hot Water,	3¼ sq. ft. per sec.
22-IN. HEIGHT: Excelsior, Steam,	2½ sq. ft. per sec.
Rococo, Steam and Hot Water,	3 sq. ft. per sec.
20-IN. HEIGHT: National Single Column, Steam and Hot Water,	1½ sq. ft. per sec.
Verona, Perfection, Perfection Wide Top, National, Ideal and Peerless, Steam,	2 sq. ft. per sec.
Verona, Perfection, Perfection Wide Top, National and Peerless, Hot Water,	2 sq. ft. per sec.
Detroit Ornamental Fluted, Detroit Ornamental Fluted Wide Top, and Detroit Plain Fluted, Steam and Hot Water,	2¼ sq. ft. per sec.
Italian Flue, Steam and Hot Water,	3¼ sq. ft. per sec.
National Four Column, Steam or Hot Water	4 sq. ft. per sec.
Detroit Flue, Steam or Hot Water,	6 sq. ft. per sec.
19-IN. HEIGHT: Excelsior, Steam,	2 sq. ft. per sec.
18-IN. HEIGHT: Rococo, Steam and Hot Water,	2¼ sq. ft. per sec.
Detroit Flue, Steam or Hot Water,	5⅓ sq. ft. per sec.
16-IN. HEIGHT: Monarch Flue, Steam,	3⅓ sq. ft. per sec.
Detroit Flue, Steam or Hot Water,	4⅔ sq. ft. per sec.
15-IN. HEIGHT: Monarch Flue, Steam,	3⅓ sq. ft. per sec.
14-IN. HEIGHT: Monarch Flue, Steam,	3⅓ sq. ft. per sec.
Detroit Flue, Steam or Hot Water,	4 sq. ft. per sec.
13-IN. HEIGHT: Detroit Flue, Steam or Hot Water,	3⅔ sq. ft. per sec.

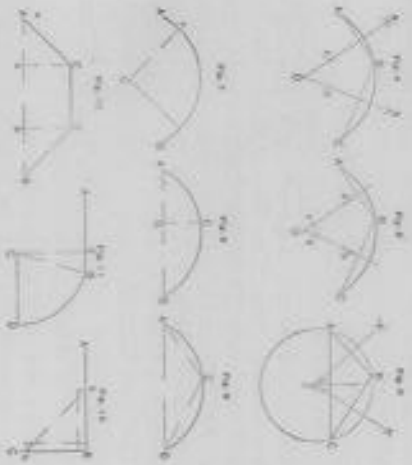
*NOTE.— For list of Detachable High Legs, Extra High Solid Legs and Pedestals, to increase distance from floor to center of tapping, see pages 53, 94 and 140.

Width in Inches.		NAME OF RADIATOR.	1 Section.		2 Sections.		3 Sections.		4 Sections.		5 Sections.	
Legs.	Intermediate Sections.	DIRECTS.	Sq. Ft.	*Length, Inches.	Sq. Ft.	*Length, Inches.	Sq. Ft.	*Length, Inches.	Sq. Ft.	*Length, Inches.	Sq. Ft.	*Length, Inches.
8½	8	38-in. Verona,	4	2½	8	5	12	7½	16	10	20	12½
9¼	7¼	38-in. Perfection,	4	2½	8	5	12	7½	16	10	20	12½
8½	7⅛	38-in. National,	4	2½	8	5	12	7½	16	10	20	12½
8½	7⅛	38-in. Ideal,	4	2½	8	5	12	7½	16	10	20	12½
8½	7⅛	38-in. Peerless,	4	2½	8	5	12	7½	16	10	20	12½
8⅜	7¼	38-in. Excelsior,	4	2	8	4	12	6	16	8	20	10
8½	8	38-in. Detroit Ornamental,	4⅓	2⅝	8⅔	4⅜	13	6⅝	17⅓	9¼	21⅔	11⅛
8½	8	38-in. Detroit Plain,	4⅓	2⅝	8⅔	4⅜	13	6⅝	17⅓	9¼	21⅔	11⅛
5½	4½	38-in. National Single Col.,	3	2½	6	5	9	7½	12	10	15	12½
10¼	10	38-in. Rococo,	5	2½	10	5	15	7½	20	10	25	12½
11¼	10½	38-in. National Four Col.,	8	2¾	16	5½	24	8¼	32	11	40	13¾
12½	12½	20-in. Detroit Flue,	6	3	12	6	18	9	24	12	30	15
8½	8½	38-in. Italian Flue,	7	3	14	6	21	9	28	12	35	15
11⅛	10¼	38-in. Monarch Flue,	9½	3	19	6	28½	9	38	12	47½	15
Height, Inches.	Length, Inches.	INDIRECTS.	1 Section.		2 Sections		3 Sections.		4 Sections.		5 Sections.	
			Sq. Ft.	Width, Inches.	Sq. Ft.	Width, Inches.	Sq. Ft.	Width, Inches.	Sq. Ft.	Width, Inches.	Sq. Ft.	Width, Inches.
8	23¼	Excelsior, Junior,	8	3⅜	16	6¾	24	10⅛	32	13½	40	16⅞
11	38	Primus,	8	3½	16	7	24	10½	32	14	40	17½
11½	36	Perf. Pin, Standard Size,	10	*2¾	20	*5½	30	*8¼	40	*11	50	*13¾
8	36	Excelsior, Steam,	12	3⅜	24	6¾	36	10⅛	48	13½	60	16⅞
8	36¼	Excelsior, Hot Water,	12	3⅜	24	6¾	36	10⅛	48	13½	60	16⅞
15½	36	Perf. Pin, Extra Large,	15	*2⅝	30	*5¾	45	*8⅝	60	*11½	75	*14⅜
11¼	37¾	Cardinal,	15	3½	30	7	45	10½	60	14	75	17½
16	37	Sterling,	20	3½	40	7	60	10½	80	14	100	17½

*To these figures add ½ inch for each bushing.

Instructions in Geometrical Drawing.

To aid the steamfitter in making accurate drawing, to show exact radius or angle within which Curved or Corner Radiator is to be placed.



For explanation of above drawings, see pages 150 and 151.
For list of Curved and Corner or Angle Radiators made at our Plants, see pages 41, 81 and 127.

FIG. 1.—*To bisect a line:*

With point *A* as a center, and a radius greater than one-half *A B*, describe the arcs *a* and *b*. With *B* as a center using radius equal to *A a*, describe arcs *b* and *b*. A line drawn through intersections of arcs *a* and *b* will divide line *A B* into two equal parts, as *A c* and *c B*.

FIG. 2.—*To erect a perpendicular at a given point in a line:*

At equal distances from the given point *C* in the line *A B*, lay off points *c* and *d*. With *c* as a center and with a radius greater than one-half of *c d*, describe arc *a*. With *d* as a center and using radius equal to *c a*, describe intersecting arc *a*.

With *c* and *d* as centers and a radius less than *c a* but greater than one-half of *c d*, describe the arcs which intersect at *b*. A line drawn through the intersecting arcs *a* and *b* will be perpendicular to line *A B* at the given point *C*.

FIG. 3.—*From a given point without a line, to let fall a perpendicular to that line:*

With given point *C* as a center and a radius greater than the distance from *C* to line *A B*, describe an arc of a circle which will intersect the line in two places, as *a* and *b*. With *a* and *b* as centers and equal radii, describe arcs which intersect at *x*. A line drawn from point *C* through intersection of arcs to line *A B* will be perpendicular to that line.

FIG. 4.—*The arc of a circle being given, to find the center of the circle of which the arc is a part:*

On the arc *A B C* take any three points as *A B C*. Join points *A*, *B* and *C* by lines *A B* and *B C*. Bisect lines *A B* and *B C* by method shown in Fig. 1. The bisecting lines *o a* and *o b* will intersect at point *o*, which will be the center of the circle of which the arc *A B C* is a part.

FIG. 5.—Same as Fig. 4 excepting that in bisecting lines *A B* and *B C* the intersecting arcs are all within the circle.

FIG. 6.—*To circumscribe a circle about a given triangle:*

Bisect the sides *A B*, *B C* and *A C*, of the triangle *A B C*. The three bisectors will meet at point *O*. With

O as a center and radius equal to *O B*, draw circle *A B C*. In taking measurements for curved or angular radiators, be sure that measurements are taken from baseboard, or projections which the radiator must clear.

For curved radiators, give us either the radius, as in Fig. 7, or, as in Fig. 8, the length of the line *A B*; the length of the perpendicular let fall from point *C* to line *A B*, and the distance of the perpendicular from points *A* and *B*, as *A D* and *D B*. Or take any three points in the arc *A B C*, in Fig. 9, and give length of sides of triangle formed by joining these points.

For angular radiators, it is necessary that we know the exact angle to which the radiator must conform. We want, therefore, sufficient information to enable us to lay out angles correctly.

FIG. 10.—Take any two points on the sides *A C* and *D B*, as *A B*, and join them with line *A B*. From the vertex of angle *C* let fall a perpencicular to line *A B*, as *C a*. From vertex of angle *D* let fall a perpendicular to line *A B*, as *D b*. Then give us the following dimensions: *A a*, *a b*, *b B*, *a C* and *b D*.

FIG. 11.—Determine the radius of arc *B D* by method shown in Figs. 4 or 5. From point *C*, the center of circle of which arc *B D* is a part, erect a perpendicular to line *A B*, as *C E*. Give length of radius *C B* and perpendicular *C E*.

FIG. 12.—With the vertex of the angle *B* as a center, lay off equal distances *B a* and *B b*. Join points *a* and *b*, and give lengths of sides *a B*, *B b* and *a b* of the triangle thus formed.

Wrenches.

On the inside of each right and left hand threaded nipple, as furnished with radiators made at our MICHIGAN and DETROIT PLANTS, (except Primus Indirect) are cast two heavy projecting lugs, so that an ordinary piece of bar iron flattened at one end, the length of nipple, can be inserted to any desired point in the radiator, and by applying wrench to bar the nipple can be unscrewed and one or more sections may be taken out independent of all the others in the stack. Made in two sizes, one for Steam, the other for Hot Water nipples.

These cast-steel wrenches, made especially for assembling Indirect Radiators connected with right and left hand threaded nipple having hexagon nut at center, are a great convenience, and we would recommend our customers to use them in preference to any other.

Saddles.

Saddle for Steam Radiator.

Saddle for Hot Water Radiator.

Above cuts show cast-iron Saddles, which fit between tops of sections of Radiators made at PIERCE PLANT, and afford a rest or support upon which marble tops can be placed. Two of these Saddles are usually sufficient for a radiator, but in the case of a radiator of 15 sections or more it is advisable to use three Saddles —one in the center.

Directions for Decorating.

One of the many advantages "AMERICAN RADIATORS" have over others is that the artistic design of ornamentation and the particularly convenient shape of sections for decorating renders it possible to obtain an extremely rich and beautiful effect, by finishing in combination of different colored bronzes, so that at a reasonable expense the Radiator can be made to correspond and harmonize with its surroundings, even the most costly and elegant.

We therefore submit the following directions, which can be easily and simply executed:

First give the Radiator a coat of paint (free from oil), properly mixed so that it will stand the heat, and when dry go over the *entire surface* of the sections with *bronze liquid*, after which apply the *dry bronze* with ordinary camel's-hair brush.

The advantages derived by using the bronze *dry* are many. A much better luster is obtained, it will last longer, and takes much less material.

After the first coat of bronze is thoroughly dry go over the *raised ornamentation* with bronze liquid, using wide, flat brush, with which it is very easy to touch *only the ornamental part*, and then apply dry bronze in *different color* from first coat, of course selecting for this a color that will harmonize with the body or first coat.

If these directions are carefully followed, an extremely rich and elegant finish is obtained.

We mention the following combinations as being particularly effective, viz:

Silver Body with Copper on Ornamental Part.
Copper Body with Silver on Ornamental Part.
Copper Body with Gold on Ornamental Part.
Blue Green with Gold on Ornamental Part.

Various other combinations will suggest themselves by the finish, etc., of the room where the Radiator is placed.

That a correct idea of the cost of decorating as above may be obtained, we mention the quantity of bronze required, viz: ¾ ounce will bronze entire section (38-inch); ¼ ounce will bronze all the ornamentation, making it necessary to use only ⅝ ounce to finish in two colors, at a cost per section for bronze, when best quality is used, of about five cents. Adding to this the cost of paint and bronze liquid, which is about one cent, makes the cost of material for decorating in combination of colors about six cents per section.

We keep on hand a stock of fine quality bronze, of our own importation, in the following colors: *Gold, Silver, Copper, Blue, Green, Fire* and *Lemon*, and respectfully solicit your orders for large or small quantities.

"American" Radiator Japans.

After the most careful experiments and tests, we are enabled to offer the trade a line of Radiator Japans of assorted colors, which will make it possible to obtain an extremely rich and artistic effect, and at the same time secure a finish that will be durable and permanent.

Too little attention, in the past, has been paid to the decoration of Radiators. Frequently, in the finest apartments, they have been decorated or bronzed without the slightest attention being paid to make them *harmonize with their surroundings.*

On this account the Radiator is made disagreeably conspicuous, whereas, were proper attention given to this important feature, the objection of many people to Steam and Hot Water Heating (on account of the ill appearance given the Radiators because of the inartistic painting or bronzing of same) would be completely removed, for, with "*American*" Radiator Japans "AMERICAN RADIATORS" can be made an *ornament to any apartment, however rich or elegant.*

From sample color card, which will be sent on application, a color can be selected to harmonize with the tint of the wall, and if any special color is wanted, send sample of what is desired to be matched, and we will make a special mixture or color to suit requirements.

A most artistic and handsome effect is obtained by touching the raised portion of the ornamentation, after the paint is thoroughly dry, with bronze liquid, and then applying dry bronze in a color to harmonize with the paint.

One gallon of paint will finish about 200 square feet of Radiator surface.

To do first-class work two coats are necessary for the dark and medium, and three for the very light colors.

Send for Sample Color Card.

Directions for Ordering.

1. Give full name of Radiator.
2. With every order give full shipping instructions.
3. Always state whether for Steam or Hot Water, and give heights.
4. If for Steam, specify whether for one or two pipe work.
5. When ordering leg sections, advise whether for supply or return connection, also stating size of tapping required and whether for use on one or two pipe Steam, or for Hot Water.
6. When ordering leg or intermediate sections, it is desirable to give date of invoice covering radiators for which the loose sections are wanted.
7. In ordering radiators, keep as close as possible to regular goods; special tappings and shapes frequently cause delay.
8. For convenience in handling, customers should, as far as possible, avoid ordering Direct Radiators in larger than a 32-section stack.
9. In ordering Curved or Corner Radiators, specify exact radius or angle of the baseboard at floor within which the radiator is to be placed, and show by sketch which end of radiator is for supply connection and which for return, as you face the inside of curve or angle.
10. For convenience in handing, Indirect Radiators will be shipped loose. Customers should, when ordering, be particular to specify the size of stacks into which sections are intended to be built, so that necessary supply and return sections may be shipped.
11. All correspondence in relation to orders and shipments should be addressed to the Branch with which order is placed, and not to Plant.
12. Arrange orders after following form (quantity of these printed forms will be promptly mailed to customers, on application), and be sure to sign your orders:

Dated Chicago, Feb. 1/1897

AMERICAN RADIATOR COMPANY
CHICAGO, ILL.

When wanted At once
Our Order No. 1000

Ship to John Doe, | *Chge. to* Richard Roe,
Via R. R. Kansas City, Mo. | Chicago, Ill.
the following RADIATORS.

No. of Radiators	Loops	Height	Kind	STYLE	TAPPED	REMARKS
5	8	38	Steam	Verona	2 pipe regular	

Telegraph Code.

IN WRITING a cipher message, please observe the following:
First—Begin every cipher word with a CAPITAL letter.
Second—Whenever a blank occurs in a sentence, the word or words supplying such blank must immediately follow the cipher word of the sentence.

Quotations and Correspondence.

	CIPHER WORD.
Quote best price on	Quadrate.
" " ... square feet of standard (38-inch Height) height of ... Radiators.	Quadrille.
Wire reply,	Quadroon.
Will wire you tomorrow morning,	Quaffed.
Have written,	Quaggy.
Answer by first mail,	Quagmire.
See our letter of ... giving full particulars,	Quaintly.
Referring to your telegram of	Quakerism.
" " letter of	Qualify.
" to our telegram of	Quandary.
" " letter of	Quarried.
We quote you for immediate acceptance,	Quash.
F. O. B. factory, and less the carload rate of freight to any railroad point of destination east of the Mississippi River and north of Tennessee or North Carolina,	Quatrain.
What is the carload freight rate to,	Quavered.
" " less than carload freight rate to	Quench.
Best rate of freight quoted on carload is	Querist.
" " " " less than carload is,	Quibbler.
Will wire you freight rates soon as received,	Quietude.
Send us your Pocket Edition of Radiator Catalogue,	Quilted.
Mail us loose sheets showing ... Radiator, for attaching to our heating estimate,	Quotient.

Orders and Shipments.

	CIPHER WORD.
Ship immediately,	Obdurate.
" by express,	Obedient.
" " freight,	Obeisance.
" " best route,	Obelisk.

Telegraph Code—Continued.

Orders and Shipments—Continued.

	CIPHER WORD.
Ship immediately and follow with tracer,	Objective.
" before present freight rates advance,	Objurgate.
" with draft and bill of lading attached,	Oblate.
Enter order as per our inquiry of,	Oblivion.
" at your quotation of,	Obscurity.
Ship by same route as our order (No. or date),	Observant.
Will send shipping instructions by mail,	Observer.
Shipping instructions for our order (No. or date) are as follows,	Obstacle.
Ship what you can at once,	Obstinacy.
Do not hold for other orders, but rush quickly as possible,	Obtruder.
Forward as small lot, unless you have carload going at once,	Obtrusive.
When can you make shipment?	Obviously.
When will order (No. or date) be shipped?	Opaque.
By what route did you ship our order (No. or date)?	Operas.
Send tracer after our order (No. or date),	Operatics.
Add to our order (No. or date),	Opiate.
Duplicate our order (No. or date),	Opium.
You may substitute on our order (No. or date),	Opossum.
Omit ... from our order (No. or date),	Opposer.
Hold for instructions order (No. or date),	Oppressor.
Could ship immediately,	Optative.
Expect to make shipment,	Optical.
Your order (No. or date) was shipped,	Optician.
Give date or number of order referred to,	Optimism.
Your order (No. or date) does not specify,	Opulent.

Quantity.

	CIPHER WORD.
200 square feet,	Arabic.
300 "	Arbiter.
400 "	Arboret.
500 "	Arcade.
600 "	Arcanum.
700 "	Archery.
800 "	Ardency.
900 "	Arena.

Quantity — Continued.

	CIPHER WORD.
1,000 square feet,	Argentine.
1,200 "	Argosy.
1,500 "	Aridity.
1,800 "	Armada.
2,000 "	Armature.
2,500 "	Arminian.
3,000 "	Armistice.
3,500 "	Armorial.
4,000 "	Armpit.
5,000 "	Aromatics.
6,000 "	Arpeggio.
7,000 "	Arquebuse.
8,000 "	Arrayed.
9,000 "	Arrogant.
10,000 "	Arrow.
12,000 "	Arsenical.
15,000 "	Arterial.
20,000 "	Artichoke.
25,000 "	Articulate.
30,000 "	Artificer.
40,000 "	Artillery.
50,000 "	Artisan.

Heights.

	CIPHER WORD.		CIPHER WORD.
13-inch Height,	Headland.	25-inch Height,	Henchman.
14 "	Hearken.	26 "	Heptagon.
15 "	Heartless.	27½ "	Heptarchy.
16 "	Heather.	30 "	Herbage.
18 "	Heedful.	31 "	Heretic.
19 "	Heiress.	32 "	Heritage.
20 "	Helmet.	33½ "	Hermetic.
21½ "	Helmsman.	38 "	Heroic.
22 "	Helpmate.	39½ "	Hesperian.
23 "	Hemlock.	44 "	Hessian.
24 "	Hempen.	45 "	Heterodox.

Number of Sections.

	CIPHER WORD.		CIPHER WORD.
2 sections,	Shackles.	19 sections,	Sherry.
3 "	Shadowy.	20 "	Shielding.
4 "	Shaggy.	21 "	Shiftless.
5 "	Shakerism.	22 "	Shingles.
6 "	Shallow.	23 "	Shining.
7 "	Shambles.	24 "	Shipwreck.
8 "	Shamrock.	25 "	Shirkful.
9 "	Sharpness.	26 "	Shivering.
10 "	Shattered.	27 "	Shocking.
11 "	Sheathe.	28 "	Shoddy.
12 "	Sheepfold.	29 "	Shoggle.
13 "	Sheepish.	30 "	Shopworn.
14 "	Shekel.	31 "	Shopping.
15 "	Shellac.	32 "	Shoulder.
16 "	Shepherd.	33 "	Shouting.
17 "	Sherbet.	34 "	Shoveling.
18 "	Sheridan.	35 "	Showery.

Supply Steam leg section for single pipe,	Showman.
" " " double "	Shredded.
" " with both supply and return at bottom,	Shrewish.
Supply Hot Water leg section,	Shrieked.
Blank leg section (Steam),	Shrillness.
Return Steam leg section,	Shrinkage.
" Hot Water leg section,	Shrivel.
Intermediate Steam section,	Shrubbery.
" Hot Water section,	Shunning.
Middle Steam leg section,	Shuttle.
" Hot Water leg section,	Shyness.

Tapping Instructions.

	CIPHER WORD.
¾-inch single pipe,	Tablature.
¾ x ¾ inch,	Tableau.
1 x ¾ "	Taciturn.
1 x 1 "	Tactician.
1-inch single pipe,	Taffeta.
1¼ x ¼ inch,	Taffrail.
1¼ x 1 "	Taintless.

Tapping Instructions—Continued.

	CIPHER WORD.
1¼ x 1¼ inch,	Tailoress.
1¼-inch single pipe,	Talisman.
1½ x 1 inch,	Talmud.
1½ x 1¼ "	Tamarind.
1½ x 1½ "	Tandems.
1½-inch single pipe,	Tangency.
2 x 1½ inches,	Tangling.
2-inch single pipe,	Tannery.
Tapped at "A,"	Tantalize.
" " "B,"	Tapestry.
" " "C,"	Tapioca.
" " "D,"	Tarpaulin.
" " "E,"	Tartaric.
" " "F,"	Tautology.
" " "G,"	Taxidermy.
" " "H,"	Tiara.
" right hand,	Tibial.
" left hand,	Ticklish.
" for single pipe Steam as per list,	Tidiness.
" " double " " " "	Tidology.
" " top supply and bottom return on same end,	Tillage.
" " top supply and bottom return on opposite ends,	Timbrel.
" " both supply and return tappings at bottom of same end,	Timidity.
" at extreme top of first section,	Timorous.
" " " " second section,	Tincture.
" underneath radiator, bottom of first section,	Tinkling.
" underneath radiator, bottom of second section	Tinseled.
" for ¼-inch air valves,	Tipstaff.
To have flush bushings,	Tirade.
To have eccentric bushings,	Titanic.
All to have detachable high legs, so that the distance from floor to center of supply tapping shall be . . . inches,	Titmouse.
All to have extra high solid legs, so that the distance from floor to center of supply tapping shall be . . . inches,	Titular.

Style and Kind of Radiators.

	CIPHER WORD.
Cardinal Indirect,	Eucaustic.
Circular for Hot Water,	Enchained.
" " Steam,	Encomium.
Corner for Hot Water,	Encompass.
" " Steam,	Encounter.
Curved " Hot Water,	Encumber.
" " Steam,	Endlessly.
Detroit Dining Room for Hot Water,	Endowment.
" " " Steam,	Endurable.
" Flue,	Enervate.
" Ornamental Fluted Direct-Indirect for Hot Water,	Enfeeble.
" Ornamental Fluted Direct-Indirect for Steam,	Engender.
" Ornamental Fluted for Hot Water,	Engrain.
" " " Steam,	Engraver.
" " Wide Top Direct-Indirect for Hot Water,	Engrosser.
" Ornamental Fluted Wide Top Direct-Indirect for Steam,	Engulf.
" Ornamental Fluted Wide Top for Hot Water,	Enigmatic.
" Ornamental Fluted Wide Top for Steam,	Enjoyable.
" Plain Fluted Direct-Indirect for Hot Water,	Enkindle.
Detroit Plain Fluted Direct-Indirect for Steam,	Enlisting.
" " for Hot Water,	Enlivener.
" " " Steam,	Ennoble.
Direct-Indirect for Hot Water,	Enormity.
" " Steam,	Enrapture.
Excelsior 1891 Pattern Direct Steam,	Enravish.
" Indirect for Hot Water,	Enrolment.
" " " Steam,	Enrooted.
" Junior Indirect for Steam,	Ensconce.
Ideal for Steam,	Enshrine.
Italian Flue Box Base for Hot Water,	Enslave.
" " " " Steam,	Enstamp.
" " for Hot Water,	Entangle.
" " " Steam,	Enthrone.
Monarch Flue for Steam,	Enticingly.
National Direct-Indirect for Hot Water,	Entreaty.

Style and Kind of Radiators—Continued.

	CIPHER WORD.
National Direct-Indirect for Steam,	Exaction.
" for Hot Water,	Exalted.
" " Steam,	Examiner.
" Four Column,	Excavate.
" Single Column for Hot Water,	Excerpt.
" " " Steam,	Exchequer.
Peerless for Hot Water,	Excision.
" " Steam,	Exclaimed.
Perfection Dining Room,	Exculpate.
" Direct-Indirect for Hot Water,	Excursive.
" " " Steam,	Execrably.
" for Hot Water,	Exemplary.
" " Steam,	Exertion.
" Wide Top Direct-Indirect for Hot Water,	Exhaled.
" Wide Top Direct-Indirect for Steam,	Exhorter.
" " for Hot Water,	Existent.
" " " Steam,	Exodus.
" Pin Indirect, Extra Large, with bolt and flange connections,	Exonerate.
" Pin Indirect, Standard Size, with bolt and flange connections,	Exordium.
" Pin Indirect, Extra Large, with right and left hand threaded nipple connections,	Expansive.
" Pin Indirect, Standard size, with right and left hand threaded nipple connections,	Expatiate.
Primus Indirect,	Expelled.
Rococo Direct-Indirect for Hot Water,	Exploiting.
" " " Steam,	Explosive.
" for Hot Water, with right and left hand threaded nipple connections,	Expounder.
" for Hot Water, with slip nipple connections,	Expulsion.
" for Steam,	Expunge.
Stairway for Steam,	Extenuate.
Sterling Indirect,	Extinct.
Verona for Hot Water,	Extinguish.
" " Steam,	Extricate.
Window Radiators for Hot Water,	Exuberant.
" " " Steam,	Exultant.

Miscellaneous.

	CIPHER WORD.
Binder or marble top frame to fit on Excelsior 1891 pattern Radiator,	Macaroni.
Box Base with back opening,	Machinate.
" " bottom "	Madrigal.
Bronze, . . . pounds of,	Maelstrom.
Bronzing Liquid, . . . gallon cans of,	Magician.
" " . . . half-gallon cans of,	Magistrate.
Bushings, 2 inches, reducing to 1½ inches,	Magnate.
" 2 " " " 1¼ "	Magnetic.
" 2 " " " 1 "	Magnolia.
" 2 " " " ¾ "	Mahogany.
" Flush,	Mahometan.
" Eccentric,	Majestic.
Carpet Feet, arranged with detachable,	Malapert.
Dampers, Floor,	Malicious.
Japan, . . . gallon cans of,	Malignant.
" . . . half-gallon cans of,	Maltreat.
Legs, fitted with detachable high; to make distance from floor to center of supply tapping . . . inches,	Malster.
" fitted with extra-high solid; to make distance from floor to center of supply tapping . . . inches,	Mammal.
" fitted with detachable Carpet (legs or feet),	Mammoth.
Nipples, 2-inch right and left hand threaded,	Manacle.
" 1½ " " " "	Mandarin.
" 2 " " " " with hexagon nut at center,	Mandatory.
" 2 inch right-hand threaded,	Manhood.
" 2¼ " slip,	Manifesto.
Pedestals, . . . inches high,	Manifold.
" to make distance from floor to center of supply tapping . . . inches,	Mankind.
Plugs, 2-inch,	Mannerism.
" 1½ "	Manoeuvre.
" ¾ " Brass (for air valve tappipg),	Marauder.
Saddles for marble tops,	Marginal.
Tops, fitted with Binder or Frame on Excelsior 1891 pattern Direct Steam Radiator for marble,	Marigold.
" fitted with lugs for marble,	Marksman.

Telegraph Code — Continued.

Miscellaneous — Continued.

	CIPHER WORD.
Tops, fitted with saddles for marble,	Martingal.
" cast-iron, for Excelsior 1891 pattern Steam Radiator,	Masculine.
" cast-iron, for Perfection Hot Water Radiator,	Massacre.
" " " " Steam Radiators,	Masticate.
Wall Boxes,	Matadore.
Wrenches, for Detroit Plant and Michigan Plant Direct Hot Water Radiators,	Maternal.
" for Detroit Plant and Michigan Plant Direct Steam Radiators,	Matrimony.
Wrench for Indirect Radiators connected with right and left hand threaded nipples having hexagon nut at center,	Mattock.

General Index.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

*Illustration.

General Index — Continued.

*Illustration.

PRESS OF THE HENRY O. SHEPARD COMPANY.