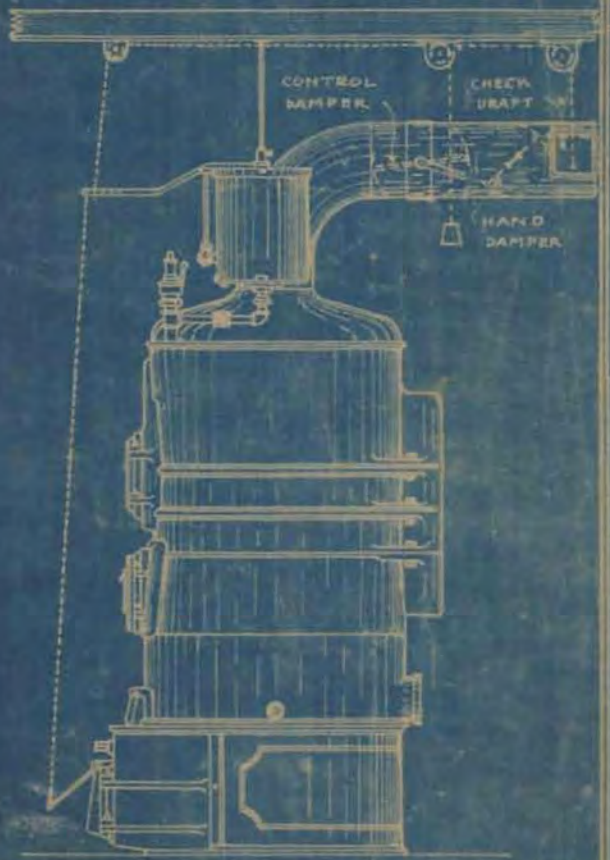
JOHNSON

JOHNSON VAPOR HEATING SYSTEMS



JOHNSON VAPOR HEATING COMPANY

BOSTON MASS

DATA BOOK

JOHNSON VAPOR HEATING SYSTEMS

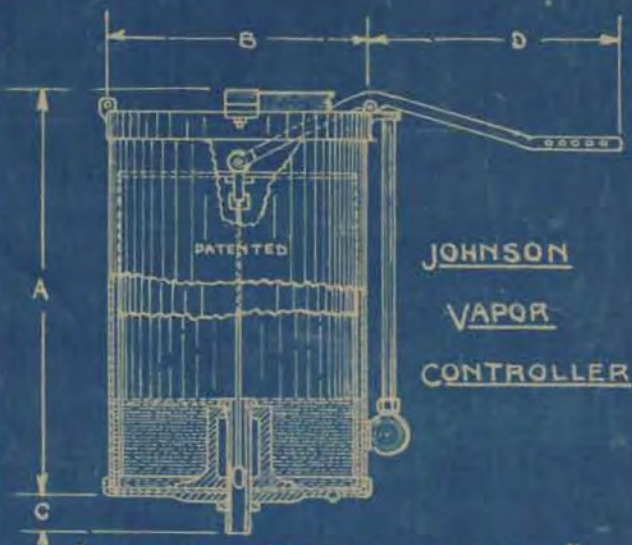
"INTRODUCTORY"

IT IS THE PURPOSE OF THIS DATA BOOK TO GIVE RELIABLE IMFORMATION SO THAT THE JOHNSON VAPOR HEATING SYSTEM CAN BE INSTALLED EASILY AND WITH POSITIVE SUCCESS.

WE WILL BE GLAD TO GIVE ANY FUTHER IMFORMATION THAT MIGHT BE DESIRED UPON REQUEST.

"CONTENTS"

JOHNSON VAPOR HEATING SYSTEM



JOHNSON
VAPOR
CONTROLLER

"THE HEART OF ANY VAPOR SYSTEM"

·PRINCIPLE·DIMENSIONS·CONTROLLER·

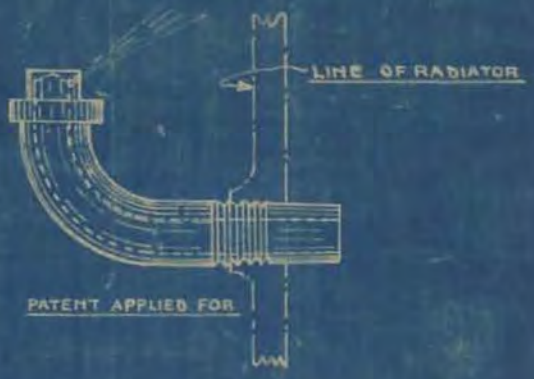
NO.	A	B	C	D	SQ.-FT. RADIATION WILL HANDLE	PRICE LIST
1	13½"	11"	1"	12"	UP TO 350	$50
2	14½"	13"	1¼"	15"	351 - 1000	100
3	20½"	13"	1¼"	15"	1001 - 2000	150
4	25½"	13"	1¼"	15"	2001 & OVER	210

THE CONTROLLER IS THE PRINCIPLE PART OF A VAPOR SYSTEM.
OUR CONTROLLER WILL FULLY OPEN OR CLOSE THE DAMPER WITH A VARIATION OF LESS THAN ONE OUNCE IN PRESSURE.
IT IS AUTOMATIC IN OPERATION AND A CONSTANT PRESSURE IS MAINTAINED, AS SET FOR.

№1

JOHNSON VAPOR HEATING SYSTEMS

• VENT • OR • HUMIDIFIER •



VENTS ARE MADE WITH 2 SIZES OF PORTS •
SIZE "A" TO BE USED ON RADIATORS UP TO 60¢
SIZE "B" TO BE USED ON RADIATORS OVER 60¢
AND WHERE A LONG DISTANCE FROM BOILER

- LIST PRICE $.50 EACH -

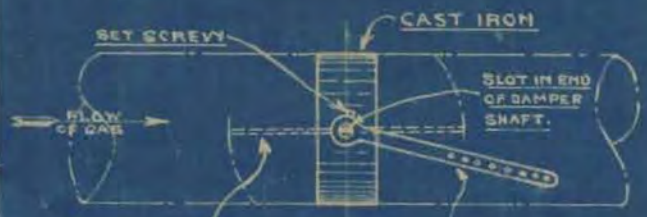
THE JOHNSON OPEN VENT OR HUMIDIFIER WILL NOT DRIP WATER OR BLOW PERCEPTIBLE VAPOR IT IS NOISELESS IN OPERATION AND WILL INCREASE THE RELATIVE HUMIDITY FROM 8% TO 20% DEPENDING ON CONDITIONS. AIR NORMALLY HAS A RELATIVE HUMIDITY OF FROM 50% TO 75%.

WHEN THE OUTSIDE TEMPERATURE IS 32° F AND THIS AIR IS HEATED TO 70° F THE RELATIVE HUMIDITY IS LESS THAN 16% OR LESS THAN THE HUMIDITY OF THE DRYEST CLIMATE KNOWN •

THE HUMIDIFYING FEATURE OF A JOHNSON VAPOR HEATING SYSTEM IS WORTH MANY TIMES ITS COST.

JOHNSON VAPOR HEATING SYSTEMS

·DAMPERS·



OVAL DAMPER APPROX. 1⅜ TIMES DIA. OF PIPE SO THAT IT WILL CLOSE WITH 4" TO 6" OF MOVEMENT FROM ARM.

ARM TO HAVE 6 TO 8 HOLES ¼" ON CENTERS SO THAT REGULATING WEIGHT CAN BE MOVED TO OR FROM SHAFT TO DECREASE OR INCREASE PRESSURE IN OUNCES.

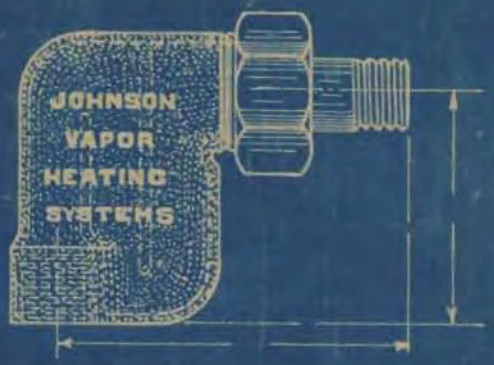
IT IS ESSENTIAL THAT A PROPER WORKING DAMPER BE USED IN CONJUNCTION WITH OUR CONTROLLER - WE CAN FURNISH THE FOLLOWING SIZES·

SIZE	LIST PRICE	SIZE	LIST PRICE
7" DIA.	$ 2.40	17" DIA.	$ 6.50
8" "	2.70	18" "	7.00
9" "	3.00	19" "	7.50
10" "	3.40	20" "	8.00
11" "	3.80	21" "	8.50
12" "	4.00	22" "	9.00
13" "	4.50	23" "	9.50
14" "	5.00	24" "	10.00
15" "	5.50		
16" "	6.00		

DAMPERS ORDERED FROM US WILL BE PACKED IN SAME BOX WITH CONTROLLER.

JOHNSON VAPOR HEATING SYSTEMS

·RETURN· TRAPS·



½" ANGLE - LIST PRICE $2.00

THE JOHNSON RETURN TRAP IS MADE IN ONE SIZE AND WILL HANDLE ANY SIZE RADIATOR UP TO 125 SQ. FT.

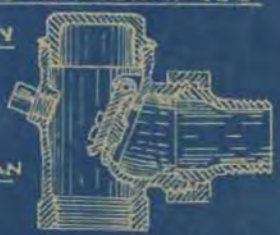
IT CAN BE USED ON OUR MODULATING SYSTEM IN CONJUNCTION WITH OUR CONTROLLER

IT CAN BE USED ON OUR SYSTEM TAKING EXHAUST STEAM FROM POWER PLANT.

IN MOST MODULATING SYSTEMS IT WILL BE OF ADVANTAGE TO USE AN ANGLE CHECK LIKE DRAWING BELOW.

MODULATING SYSTEMS IN RESIDENCES AND ONE & TWO STORY BUILDINGS DO NOT REQUIRE A TRAP

A UNION CHECK VALVE CAN BE USED.

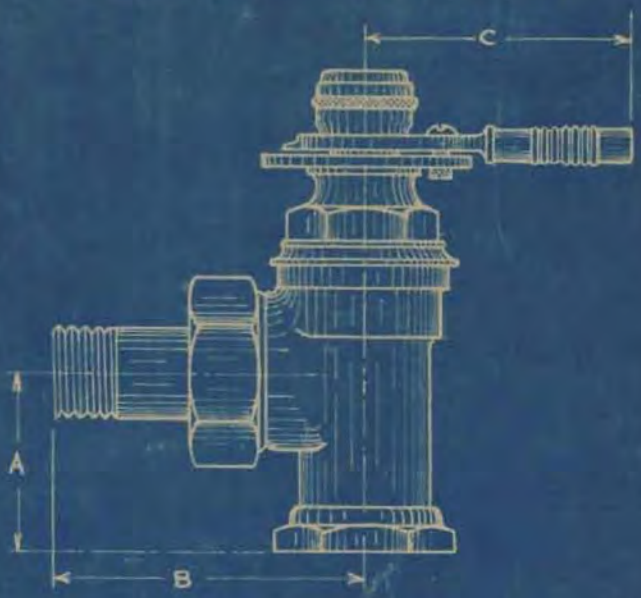


½" ANGLE CHECK - LIST PRICE $2.00

No4

JOHNSON VAPOR HEATING SYSTEMS

·MODULATING · SUPPLY · VALVES·



·DIMENSIONS· CAPACITY · LIST PRICE·

SIZE	A	B	C	MAXIMUM PORT AREA SQ. INCHES	SIZE RADIATOR	LIST PRICE
1/2"	1 1/32"	2 15/32"	2 9/16"	.196	up to 25 ft	$3.80
3/4"	1 25/32"	3 1/4"	2 15/16"	.442	26 ft - 50 ft	$4.50
1"	2"	3 1/4"	2 15/16"	.711	51 ft - 100 ft	$5.50
1 1/4"	2 5/8"	3 1/2"	2 15/16"	1.195	100 ft & Over	$7.00

WE RECOMMEND A VALVE HAVING AN OPENING IN AREA EQUAL TO A 3/4" INCH PIPE

VALVES SHOULD BE PACKLESS · GRADUATED · MODULATING VAPOR VALVES, THEIR PORTS SHOULD BE ADJUSTED AFTER BEING CONNECTED TO RADIATOR.

No 5

JOHNSON VAPOR HEATING SYSTEMS

TABLE SHOWING DIFFERENCE BETWEEN VAPOR AND STEAM

BOILER PRESSURE IN POUNDS -	⅛ TO ½	2	3	4	5
MEAN TEMPERATURE AT RADIATOR.	213	217	219	222	225
TEMPERATURE OF SPACE BEING HEATED.	70°	70°	70°	70°	70°
B.T.U. PER SQ. FT. 2 OR 3 COL. RADIATION	236	243	247	251	256
NUMBER OF B.T.U. MORE IN STEAM THAN VAPOR.	⅛ TO ½ POUND TAKEN AS VAPOR	6½	11	15	20
% DIFFERENCE.		2.8	4.6	6.3	8.4
LOSS IN DEGREES F BY USING VAPOR OVER STEAM AT GIVEN PRESSURE.		1.9	3.2	4.4	5.9
TEMPERATURE OBTAINED BY USE OF VAPOR OVER STEAM AT GIVEN PRESSURE.		68°	67°	66°	64°

BY THE USE OF THE JOHNSON VENT OR HUMIDIFIER - ALL AIR IS EXPELLED FROM THE RADIATOR - THE RELATIVE HUMIDITY IS INCREASED AND THE CONTROLLER KEEPS A CONSTANT TEMPERATURE THEREBY MAKING VAPOR AS EFFICIENT AS STEAM AT 2 POUNDS PRESSURE.

N26

JOHNSON VAPOR HEATING SYSTEMS

SIZE OF MAINS

TWO PIPE WORK			
RADIATION IN SQUARE FEET	SUPPLY MAIN	DRY RETURN	WET RETURN
60	1¼"	1"	1"
100	1½"	1"	1"
250	2"	1¼"	1"
500	2½"	1½"	1¼"
800	3"	1½"	1¼"
1200	3½"	1½"	1½"
1800	4"	2"	2"
3200	5"	2½"	2"
5000	6"	2½"	2½"
7200	7"	3"	3"
11000	8"	3½"	3"
15000	9"	4"	3½"
28000	10"	5"	4"

ONE PIPE WORK			
50	1¼"		
80	1½"		
200	2"		
350	2½"		
600	3"		
1000	3½"		
1500	4"		
2700	5"		
4000	6"		
6000	7"		
9000	8"		
12000	9"		
18000	10"		

FOR DIRECT-INDIRECT RADIATION ADD 35% AND FOR INDIRECT RADIATION ADD 75% TO ABOVE SIZES

NR7

JOHNSON VAPOR HEATING SYSTEMS

· HEAT · TRANSMISSION ·

SQ. FT. of MATERIAL	COEFFICIENT	B.T.U. LOSS 0° to 70°F
8" BRICK WALL.	.46	32.2
12" BRICK WALL.	.32	22.4
16" BRICK WALL.	.26	18.2
20" BRICK WALL.	.23	16.1
12" CONCRETE.	.49	34.3
16" CONCRETE.	.43	31.1
20" CONCRETE.	.38	26.6
SINGLE WINDOW	1.20	84.0
DOUBLE WINDOW	.58	45.6
SINGLE SKYLIGHT	1.00	70.0
DOUBLE SKYLIGHT	.60	42.0
DOOR ⅓ GLASS	.60	42.0
DOOR	.40	28.0
1" TILE ROOF	.80	56.0
TAR & GRAVEL ROOF	.32	22.4
WOODEN WALL	.40	28.0
CEILING NEAR ROOF	.32	22.4
EARTH FLOOR	.15	10.5
CEILING WITH AIR SPE	.14	9.8

FOR NORTH EXPOSURE ADD 10%

1 B.T.U. WILL RAISE THE TEMPERATURE OF 50 CU. FT. OF AIR ONE DEGREE F. THE CU. CONTENTS X THE TEMPERATURE DIFFERENCE BETWEEN OUTSIDE & INSIDE ÷ 50 = HEAT REQUIRED IN B.T.U. PER HOUR TO WARM THE AIR, THIS ALLOWS FOR ONE AIR CHANGE PER HOUR.

ONE SQ. FT. OF DIRECT RADIATION WILL GIVE OFF 236 B.T.U. PER HOUR AT VAPOR

JOHNSON VAPOR HEATING SYSTEMS

• TESTING • SYSTEM •

• THIS TABLE SHOWS THE TEMPERATURE THAT SHOULD BE OBTAINED IN A ROOM FOR VARIOUS OUTSIDE TEMPERATURES •

• TABLE IS BASED ON USING DIRECT RADIATION AND THAT ROOM IS TO BE HEATED TO 70° F IN ZERO WEATHER •

TEMPERATURE OF THE AIR OUTSIDE	TEMP. OBTAINED IN THE ROOM 2 COL. RAD.	TEMP. OBTAINED IN THE ROOM 3 COL. RAD.
°-30	52° F	53°F
°-20	58°	59°
°-10	64°	64°
ZERO	70°	70°
10° F	77°	75°
20°	82°	82°
30°	90°	89°
40°	97°	95°
50°	103°	105°
60°	110°	108°
70°	117°	115°
80°	123°	121°
90°	130°	128°
100°	137°	134°

IF A RADIATOR IS SLOW IN HEATING AND IS A LONG WAYS FROM THE BOILER TAKE OFF THE VENT AND APPLY A SIZE B VENT IN ITS PLACE.

BE SURE THAT MAINS IN BASEMENT ARE WELL VENTED AND PROPERLY DRAINED

BE SURE BOILER IS WELL CLEANED OF OIL, GREASE, DIRT, ETC.

N°9

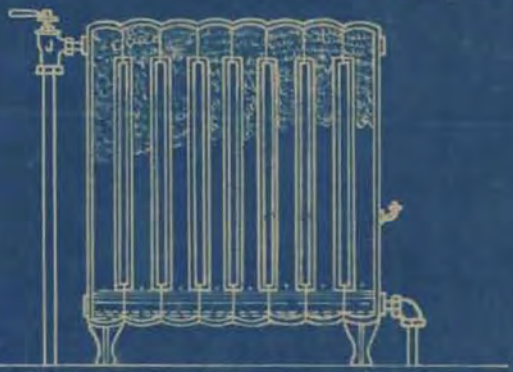
JOHNSON VAPOR HEATING SYSTEMS

·CLEAN · BOILERS·

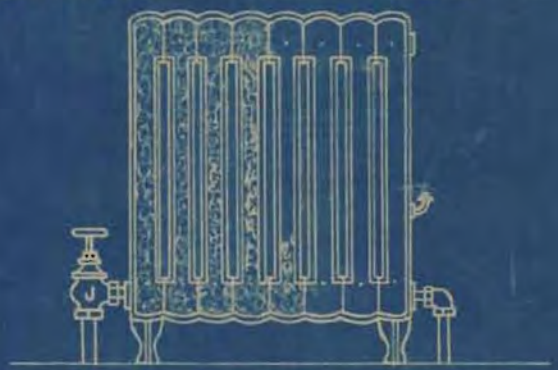
·CLEAN·WATER·WILL· BOIL·&· VAPORIZE·AS·
·SHOWN·ABOVE – IF·DIRT·OR·GREASE·IS·
·PUT·IN·THIS·CLEAN·BOILING·WATER·
·EFFECT·WILL·BE·AS·SHOWN·BELOW·

·BLOW·OUT·BOILER·&·CLEAN·SYSTEM·THOROU-
·GHLY·BEFORE·TESTING·APPARATUS·
·BOILER·MUST·BE·FREE·FROM·GREASE·OR·IT·WILL·
·FOAM·&· THROW· WATER·UP·INTO·VAPOR·MAIN·

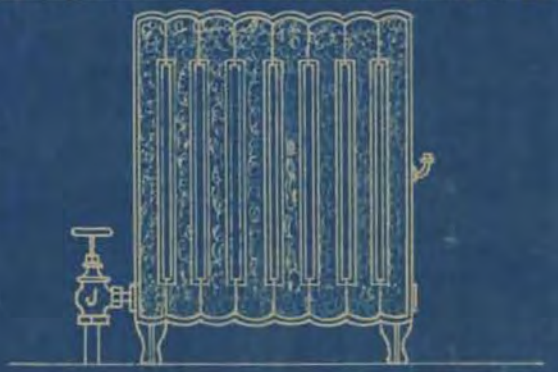
JOHNSON VAPOR HEATING SYSTEMS



MODULATING VALVE ATTACHED TO THE TOP OF RADIATOR - PARTLY TURNED ON -



STANDARD ANGLE VALVE ATTACHED TO BOTTOM OF RADIATOR - PARTLY TURNED ON -



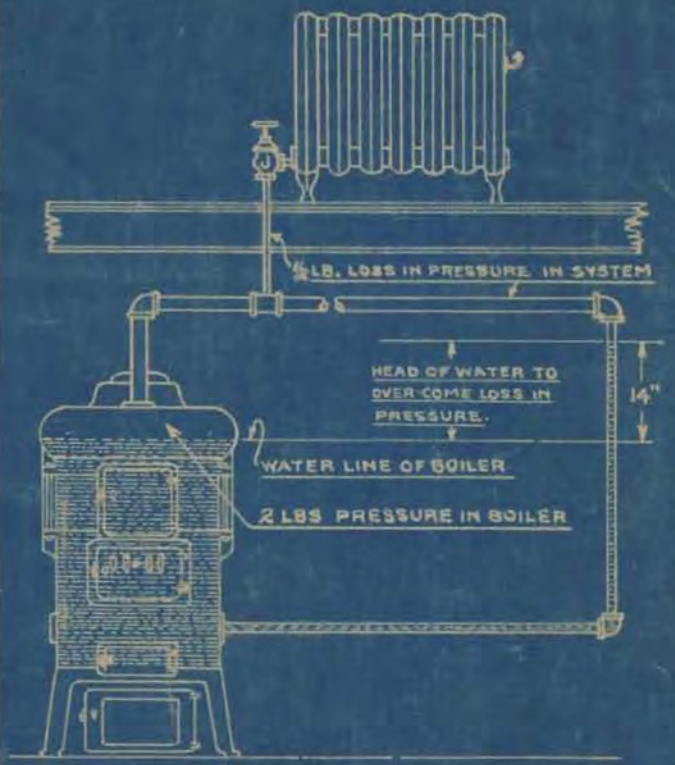
ONE PIPE VAPOR CONNECTION
(VALVE MUST BE OPEN OR CLOSED)

THE ABOVE SHOWS FLOW OF VAPOR WITH DIFFERENT CONNECTIONS.

No 11

JOHNSON VAPOR HEATING SYSTEMS

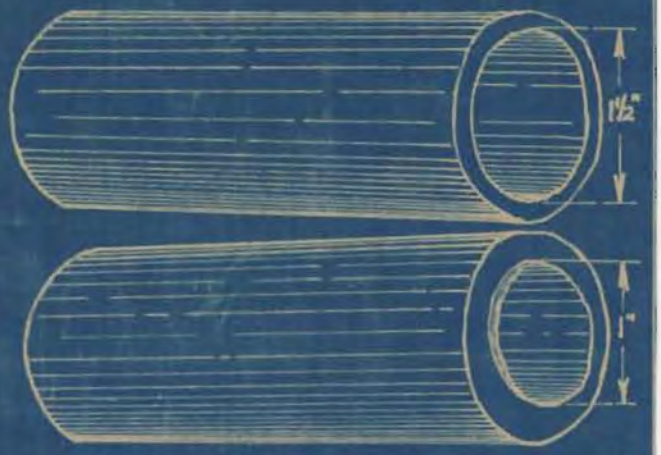
WHY WATER BACKS UP INTO THE RETURN PIPING OF STEAM SYSTEM



AMPLE DISTANCE BETWEEN MAINS AND WATER LINE IS MOST ESSENTIAL WITH A STEAM SYSTEM AS IT IS NECESSARY TO HAVE A HEAD OF WATER EQUAL TO THE LOSS OF PRESSURE IN THE SYSTEM - OTHERWISE WATER WILL BACK UP INTO MAINS - CAUSING NO END OF TROUBLE - WITH A VAPOR SYSTEM 12" BETWEEN WATER LINE OF BOILER & MAINS WILL LET CONDENSATION RETURN TO THE BOILER WITHOUT BACKING UP INTO MAINS.

N°12

JOHNSON VAPOR HEATING SYSTEMS



1" DIA. = .7854 SQ. IN. AREA.

1½" DIA. = 1.7670 SQ. IN. AREA.

ALL PIPES 1½" AND SMALLER TO BE REAMED AND PIPE STOOD ON END AND POUNDED

WATER POCKET

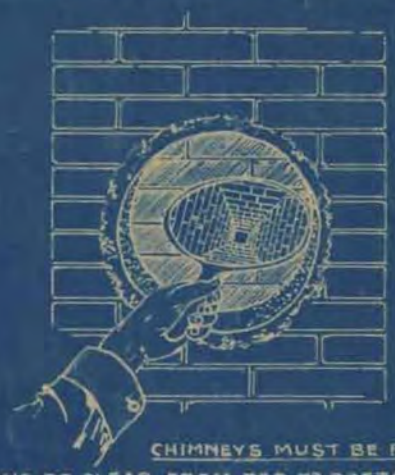
USE ECCENTRIC REDUCING FITTING

WHEN MAIN IS TO BE RAISED DRIP SAME AS SHOWN

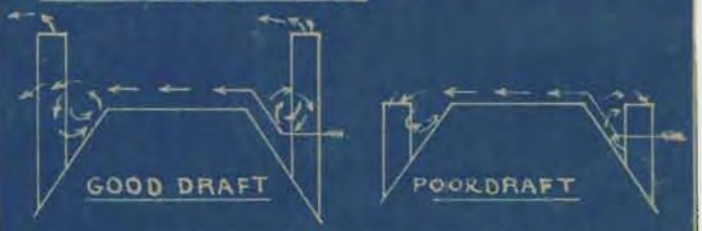
M213

JOHNSON VAPOR HEATING SYSTEMS

- CHIMNEYS -



CHIMNEYS MUST BE FREE FROM LEAKS AND BE CLEAR FROM TOP TO BOTTOM AND OF PROPER SIZE TO CREATE A GOOD DRAFT. TO SEE WHETHER OR NOT A FLUE IS CLEAR PLACE MIRROR AT BOTTOM AS SHOWN ABOVE.



THE CHIMNEY SHOULD BE EITHER ROUND OR NEARLY SQ., SMOOTH INSIDE, PERFECTLY TIGHT, AND THERE SHOULD BE NO OPENING INTO IT EXCEPT FROM THE BOILER. THE ARROWS IN DRAWINGS SHOW ACTION

OF DRAFT FOR VARIOUS CONDITIONS. NOTE THAT DRAFT IS VERY POOR IN CHIMNEY OF ELL ON THE ABOVE HOUSE.

NO. 14

JOHNSON VAPOR HEATING SYSTEMS

AREA · CIRCUM · SQ · CUB · SQ. & CU. ROOTS

NR.	CIRCUM	AREA	SQ.	CUBE	SQ. ROOT.	CU. ROOT.
1/4	.7854	.049087	.0625	.015625	.5	.63
1/2	1.5708	.19635	.25	.1250	.7071	.7937
3/4	2.3562	.441787	.5625	.42187	.8660	.9086
1	3.1416	.7854	1.	1.	1.	1.
1 1/4	3.927	1.2272	1.5625	1.953	1.118	1.077
1 1/2	4.7124	1.7691	2.2500	3.375	1.2247	1.1447
1 3/4	5.4978	2.4053	3.0625	5.359	1.323	1.205
2	6.2832	3.1416	4	8	1.4142136	1.259921
2 1/2	7.854	4.9087	6.25	15.625	1.581	1.357
3	9.4248	7.068	9	27	1.7320508	1.442249
3 1/2	10.9956	9.621	12.25	42.875	1.871	1.518
4	12.566	12.566	16	64	2.	1.587401
4 1/2	14.1372	15.904	20.25	91.125	2.121	1.651
5	15.708	19.635	25	125	2.236068	1.709975
6	18.849	28.274	36	216	2.449489	1.817120
7	21.991	38.484	49	343	2.645751	1.912931
8	25.133	50.265	64	512	2.828427	2.
9	28.274	63.617	81	729	3.	2.080083
10	31.416	78.54	100	1000	3.162277	2.154434
11	34.557	95.033	121	1331	3.316624	2.223980
12	37.699	113.097	144	1728	3.464101	2.289428
13	40.841	132.732	169	2197	3.605551	2.351334
14	43.983	153.938	196	2744	3.741657	2.410142
15	47.124	176.715	225	3375	3.872983	2.466212
16	50.265	201.062	256	4096	4.	2.519842
17	53.407	226.98	289	4913	4.123105	2.571281
18	56.548	254.464	324	5832	4.242640	2.620741
19	59.690	283.529	361	6859	4.358598	2.668401
20	62.832	314.16	400	8000	4.472136	2.714417
21	65.973	346.361	441	9261	4.582575	2.758924
22	69.115	380.133	484	10648	4.690415	2.802039
23	72.256	415.476	529	12167	4.795831	2.843867
24	75.398	452.39	576	13824	4.898979	2.884499
25	78.54	490.87	625	15625	5.	2.924014
26	81.681	530.93	676	17576	5.099019	2.962496
27	84.823	572.556	729	19683	5.196152	3.
28	87.965	615.753	784	21952	5.291502	3.036588
29	91.106	660.52	841	24389	5.385164	3.072316
30	94.248	706.86	900	27000	5.477225	3.107232
31	97.389	754.77	961	29791	5.567764	3.141380
32	100.531	804.25	1024	32768	5.656854	3.174802
33	103.67	855.30	1089	35937	5.744562	3.207534
34	106.81	907.92	1156	39304	5.830951	3.239611
35	109.95	962.11	1225	42875	5.916079	3.271066
36	113.09	1017.88	1296	46656	6.	3.301927
37	116.24	1075.21	1369	50653	6.082762	3.332221
38	119.38	1134.12	1444	54872	6.164414	3.361975
39	122.52	1194.59	1521	59319	6.244998	3.391211
40	125.66	1256.64	1600	64000	6.324555	3.419951
41	128.80	1320.26	1681	68921	6.403124	3.448217
42	131.95	1385.45	1764	74088	6.480740	3.476026

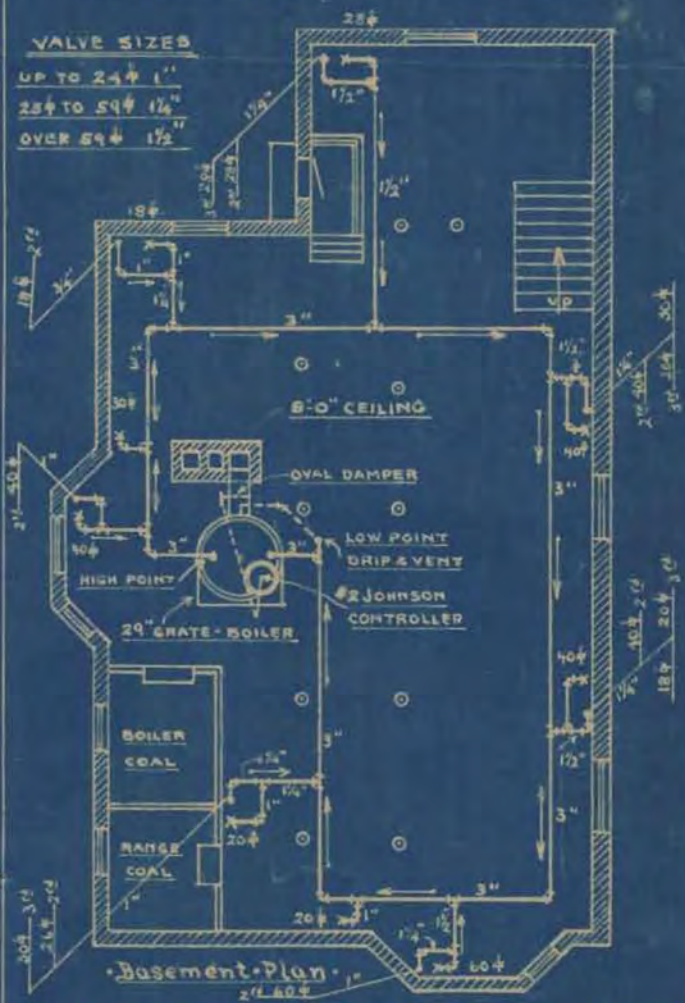
NE16

JOHNSON VAPOR HEATING SYSTEMS

• TYPICAL • 1 • PIPE • LAYOUT •

1ST FLOOR	296 #	8'-4"	CEILING
2ND FLOOR	252 #	8'-6"	"
3RD FLOOR	70 #	7'-9"	"
TOTAL	618 #		

VALVE SIZES
UP TO 24 # 1"
25 # TO 59 # 1¼"
OVER 59 # 1½"



• Basement • Plan •

MAINS TO PITCH 1" IN 10'-0" IN DIRECTION OF ARROWS
BRANCH CONNECTIONS TO PITCH BACK INTO MAIN 1" IN 4'-0" AND TO BE 1 SIZE LARGER THAN RISER.
ALL PIPE 1½" & SMALLER TO BE REAMED.
BOILER TO HAVE SEPERATE FLUE.
WE STRONGLY RECOMMEND COVERING BOILER AND MAINS.

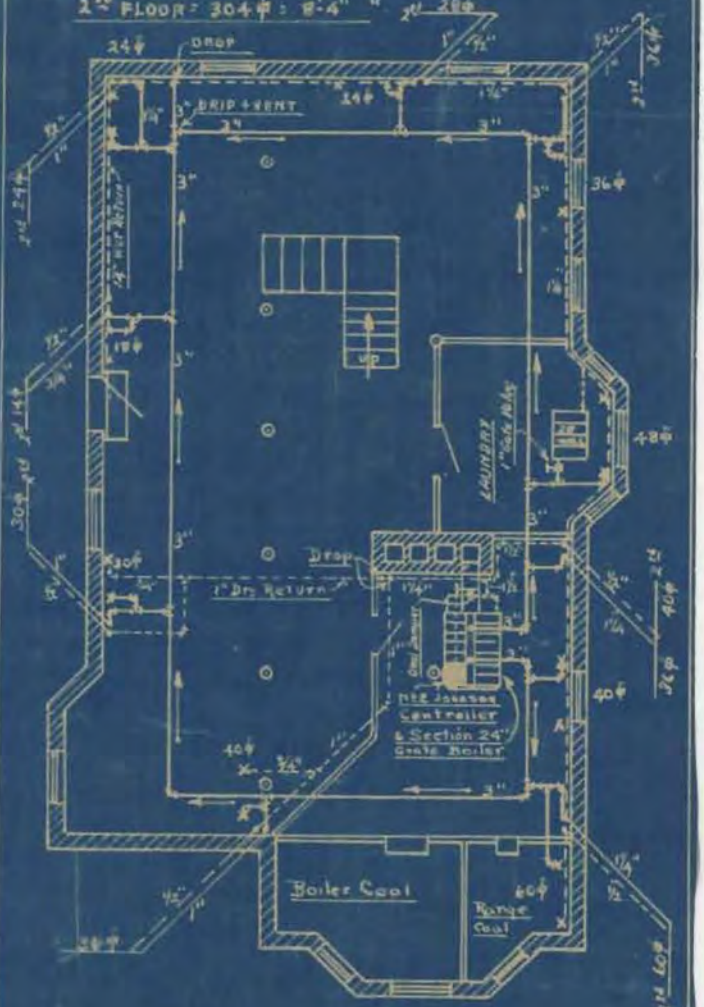
JOHNSON VAPOR HEATING SYSTEMS

·TYPICAL·MODULATING·LAYOUT·

BASEMENT= 28⌀ : 7'-10" CEILING

1ST FLOOR= 320⌀ : 8'-4" "

2ND FLOOR= 304⌀ : 8'-4" "



·Basement·Plan·

BRANCH CONNECTION TO BE ONE SIZE LARGER THAN RISER AND TO PITCH 1" IN 4'-0"-

MAINS TO PITCH 1" IN 10'-0" IN DIRECTION OF ARROWS.

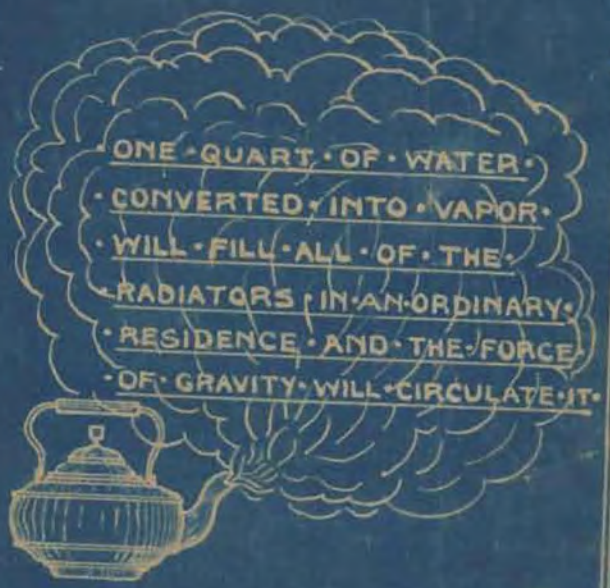
BOILER & PIPING TO BE COVERED.

BOILER TO HAVE SEPERATE FLUE.

USE ½" VALVE ON RADS UP TO 25⌀ & ¾" VALVE from 25 to 50⌀

No 18

JOHNSON VAPOR HEATING SYSTEMS



A FEW OUNCES OF PRESSURE
WILL HEAT THE LARGEST BUILDING

COMFORT

FLEXIBILITY

EFFICIENCY

FULLY GUARANTEED

JOHNSON VAPOR HEATING CO.

BOSTON MASS