A. Mattress

STANDARD DETAILS

FOR

SEWERS

DEPARTMENT OF PUBLIC WORKS

Bureau of Surveys

PHILADELPHIA

1905

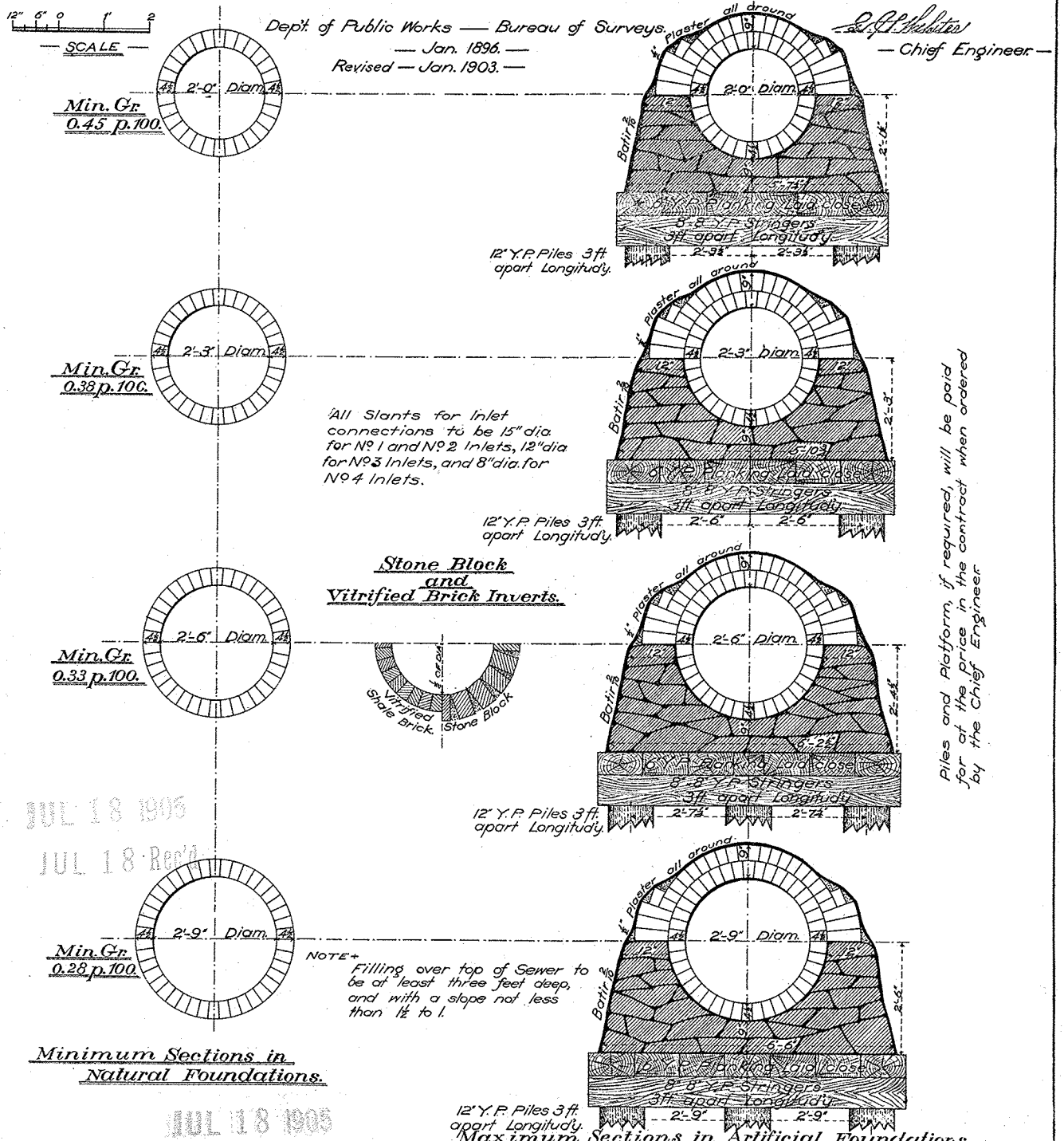
GEORGE S WEBSTER,
Chief Engineer.

GENERAL SECTIONS of CIRCULAR SEWERS.

12" 6" 0 1' 2
— SCALE —

Dep't. of Public Works — Bureau of Surveys.
— Jan. 1896. —
Revised — Jan. 1903. —

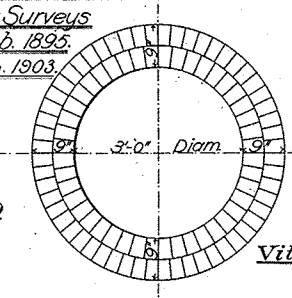
Geo. S. Webster
— Chief Engineer. —



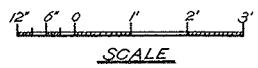
— GENERAL SECTIONS of CIRCULAR SEWERS. —

Dep't of Public Works
Bureau of Surveys
Feb. 1895.
Revised—Jan. 1903.

E. F. Webster
Chief Engineer.

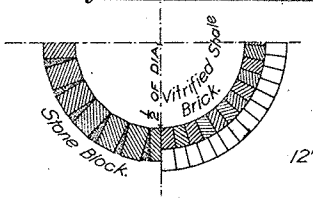


Min. Gr.
0.25 p. 100

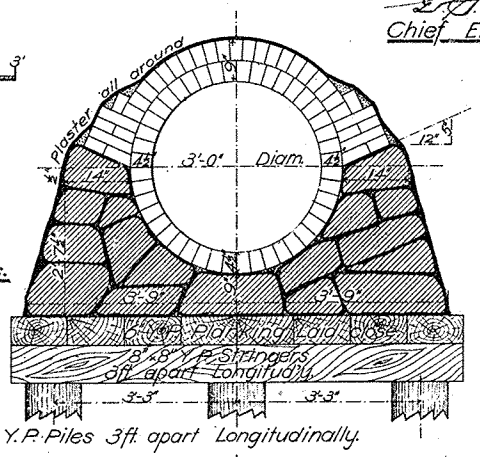


SCALE

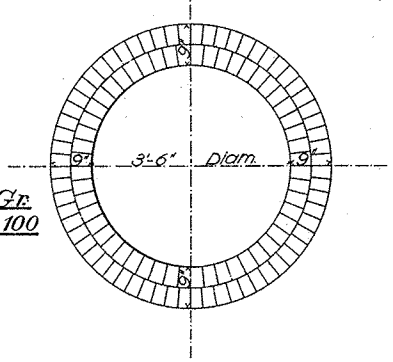
Stone Block
and
Vitrified Brick Inverts.



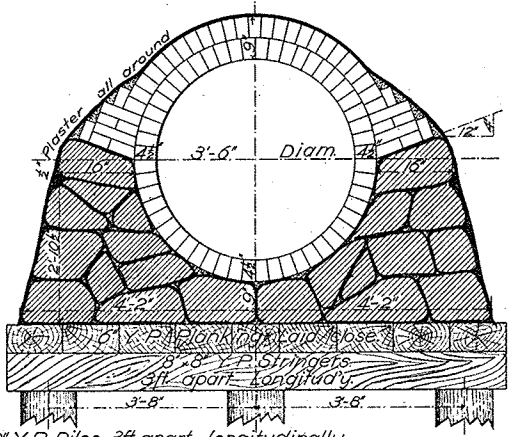
All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets, 12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets.



12" Y.P. Piles 3ft. apart Longitudinally.



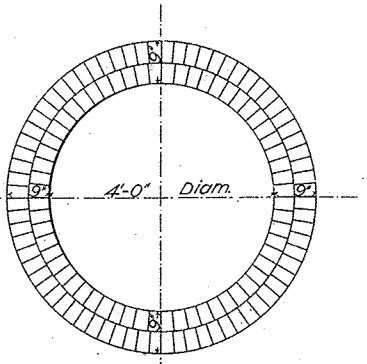
Min. Gr.
0.20 p. 100



12" Y.P. Piles 3ft. apart Longitudinally.

Piles and Platform, if required, will be paid for at the price in the contract when ordered by the Chief Engineer.

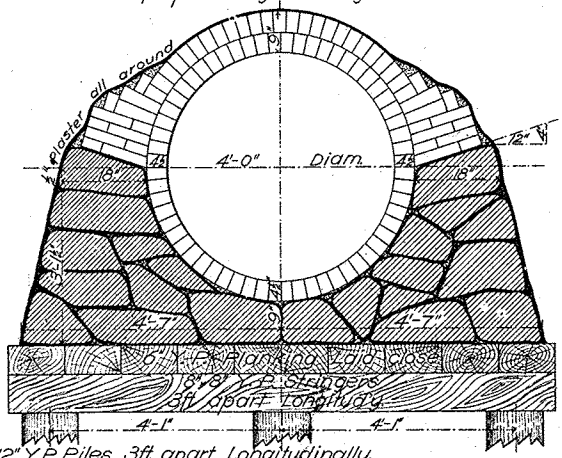
NOTE:- Filling over top of Sewer to be at least three feet deep, and with a slope not less than ½ to 1



Min. Gr.
0.16 p. 100

Minimum Sections in Natural Foundations.

NOTE:- Use double Ring of Brickwork in either Earth or Rock Excavation



12" Y.P. Piles 3ft apart Longitudinally.

Maximum Sections in Artificial Foundations.
Platform and Piles where directed.

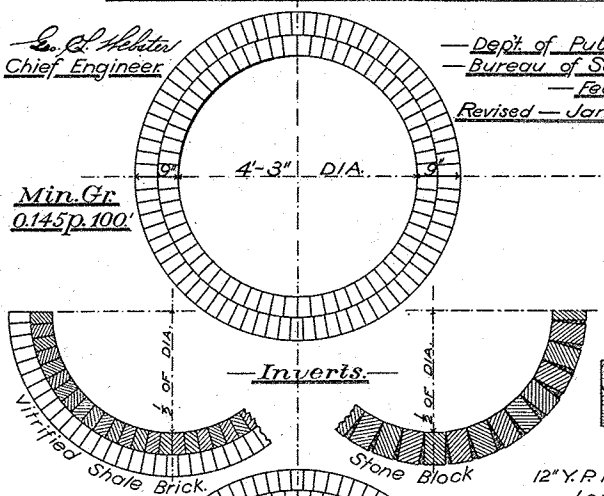
Chas. Frommer.

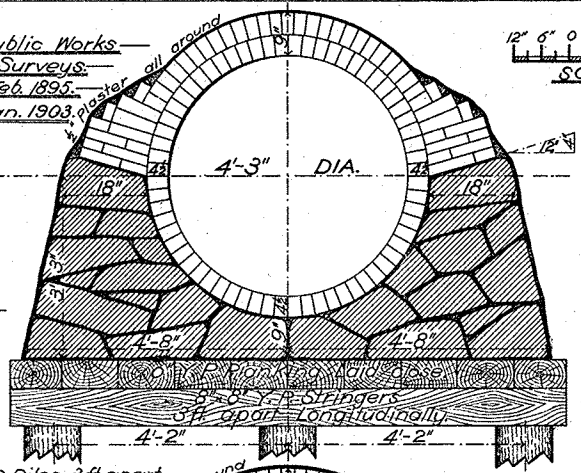
—GENERAL SECTIONS of CIRCULAR SEWERS.—

L. L. Webster
Chief Engineer.

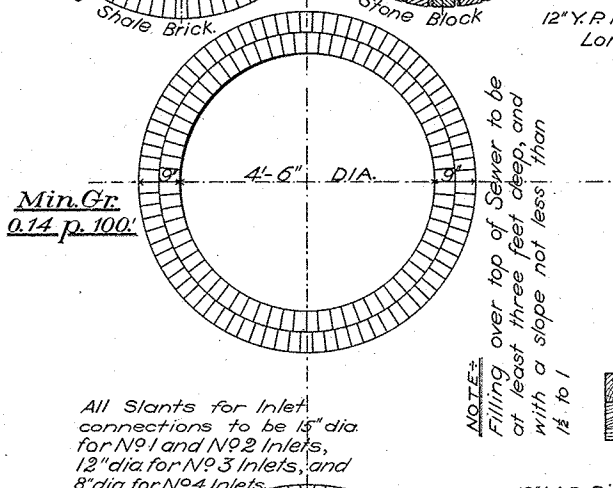
—Dep't. of Public Works.—
—Bureau of Surveys.—
—Feb. 1895.—
Revised — Jan. 1903.

12" 6" 0 1' 2'
SCALE.

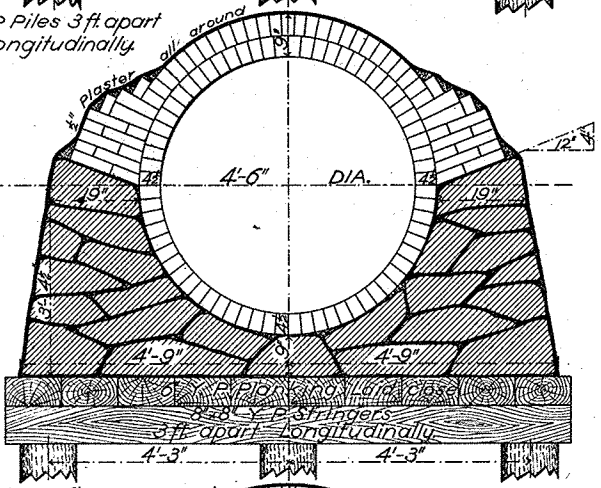




12" Y.P. Piles 3 ft. apart Longitudinally.



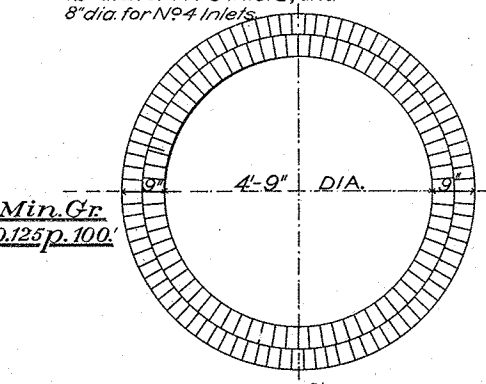
NOTE:— Filling over top of Sewer to be at least three feet deep, and with a slope not less than 1½ to 1



12" Y.P. Piles 3 ft. apart Longitudinally.

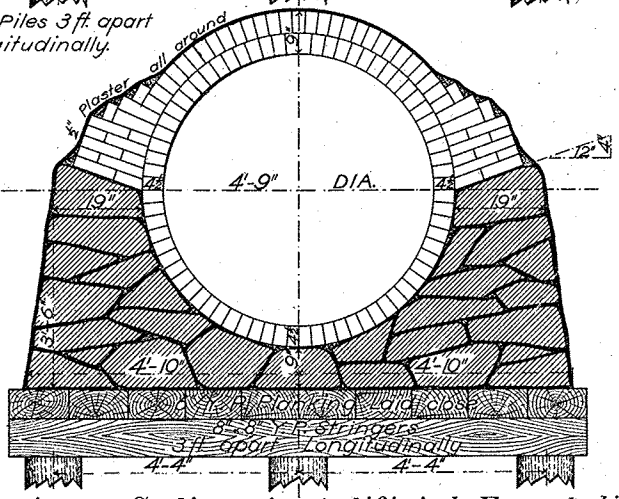
Piles and platform, if required, will be paid for at the price in the contract when ordered by the Chief Engineer

All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets, 12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets.



Minimum Sections in Natural Foundations.

NOTE:— Use double Ring of Brickwork in either Earth or Rock Excavation.



12" Y.P. Piles 3 ft. apart Longitudindlly.

Maximum Sections in Artificial Foundations. Platform and Piles where directed.

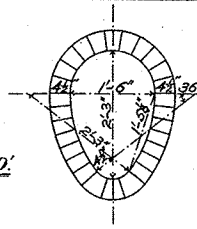
Chas. Frommer.

General Sections of Egg-Shaped Sewers.

Dept. of Public Works
Bureau of Surveys
Jan. 1903.

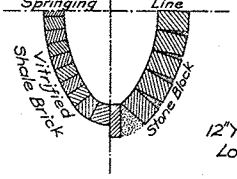
L. G. Webster
Chief Engineer.

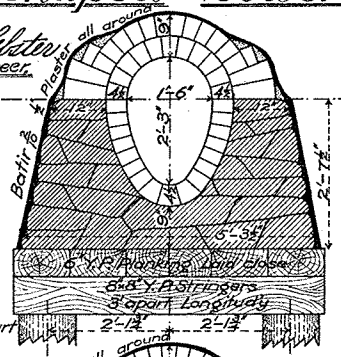
SCALE 12" 6" 0 1' 2 Ft.

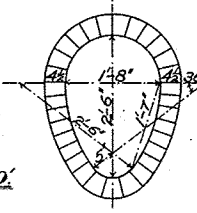


2'-3"×1'-6"
Min. Gr.
0.53' p.100'.

Stone Block and Vitrified Brick Inserts.





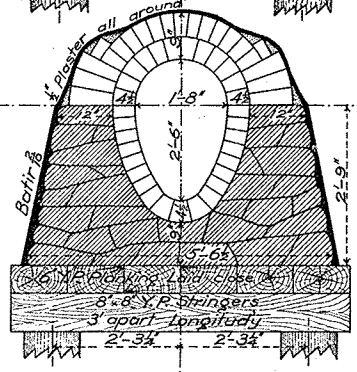


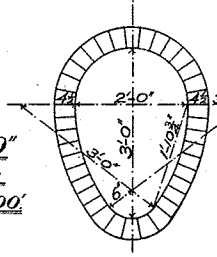
2'-6"×1'-8"
Min. Gr.
0.45' p.100'.

General Notes.

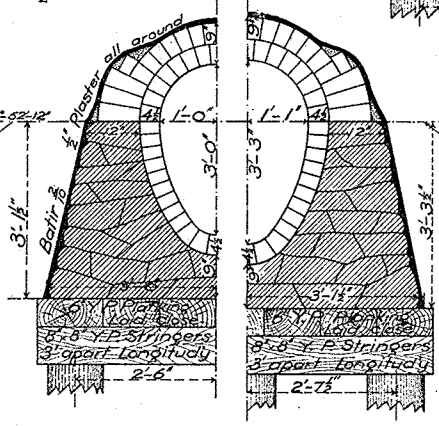
Piles and Platform if required, will be paid for at the price in the contract when ordered by the Chief Engineer.

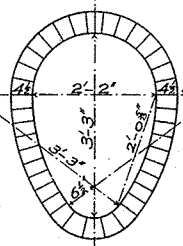
Filling over top of Sewer to be at least 3 ft. deep and with a slope not less than 1½ to 1.



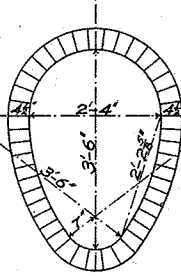


3'-0"×2'-0"
Min. Gr.
0.38' p.100'.



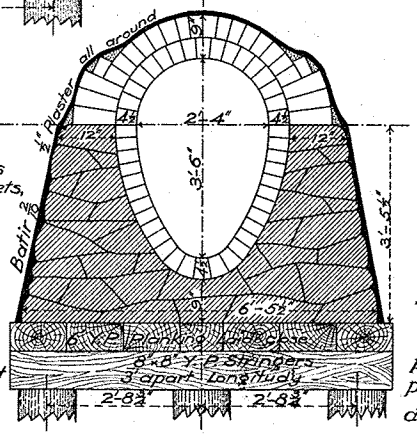


3'-3"×2'-2"
Min. Gr.
0.33' p.100'.



3'-6"×2'-4"
Min. Gr.
0.28' p.100'.

All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets, 12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets.



Minimum Sections in Natural Foundations.

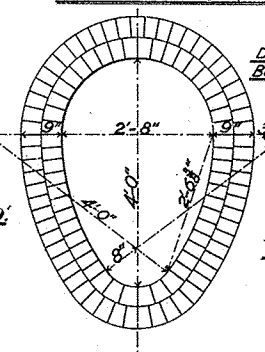
Maximum Sections in Artificial Foundations. Platform and Piles where directed.

General Sections of Egg-Shaped Sewers.

Dept. of Public Works
Bureau of Surveys
Jan. 1903.

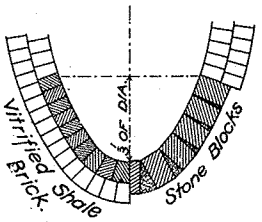
L. H. Webster
Chief Engineer.

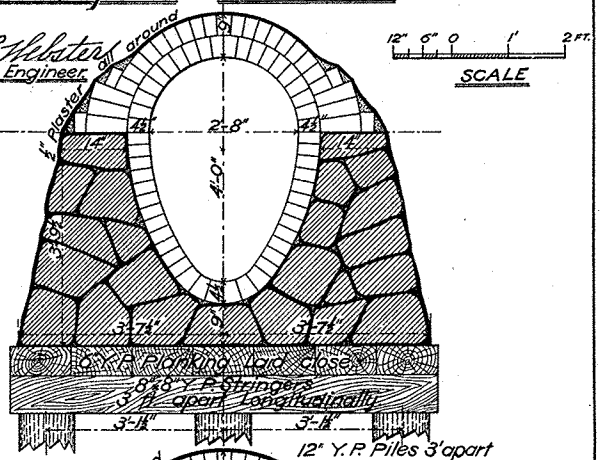
SCALE 12" 6" 0 1' 2 FT.



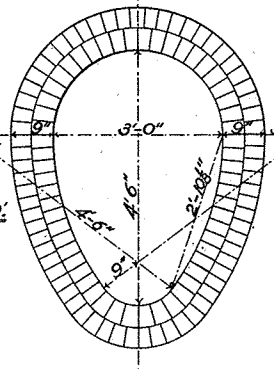
4'-0" × 2'-8"
Min. Gr.
0.25' p. 100'.

Stone Block and Vitrified Brick Inverts.

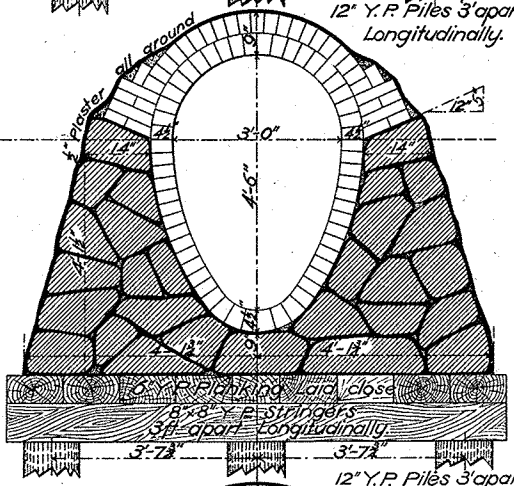




12" Y.P Piles 3' apart Longitudinally.



4'-6" × 3'-0"
Min. Gr.
0.20' p. 100'.



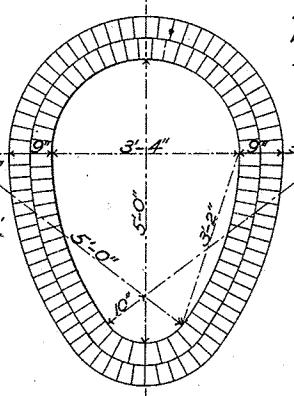
12" Y.P Piles 3' apart Longitudinally.

General Notes.

Use double Ring of brick-work in either Earth or Rock Excavation.

Piles and Platform if required, will be paid for at the price in the contract when ordered by the Chief Engineer.

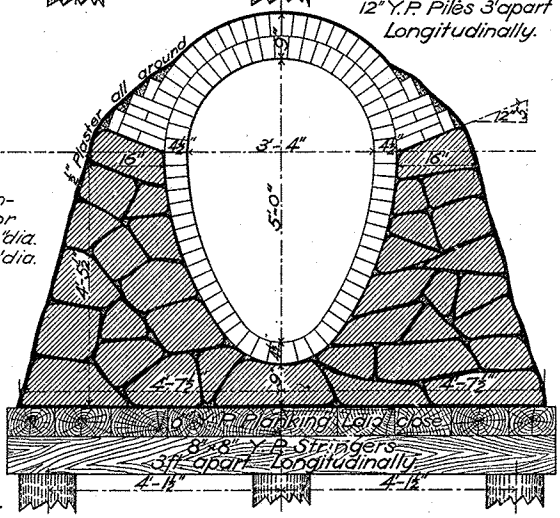
Filling over top of Sewer to be at least 3 ft. deep and with a slope not less than 1½ to 1.



5'-0" × 3'-4"
Min. Gr.
0.18' p. 100'.

Minimum Sections in Natural Foundations.

All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets, 12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets.



12" Y.P. Piles 3 ft. apart Longitudinally.

Maximum Sections in Artificial Foundations.
Platform and Piles where directed.

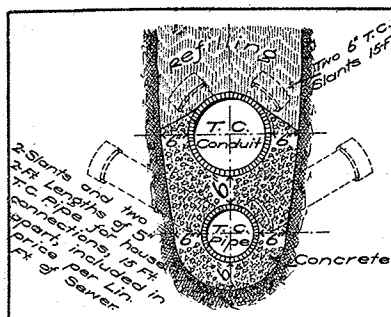
STANDARD CROSS SECTIONS
FOR
SEPARATE SYSTEM.

—Dep't. of Public Works— —Bureau of Surveys.—

—Phila. Jan. 1897—

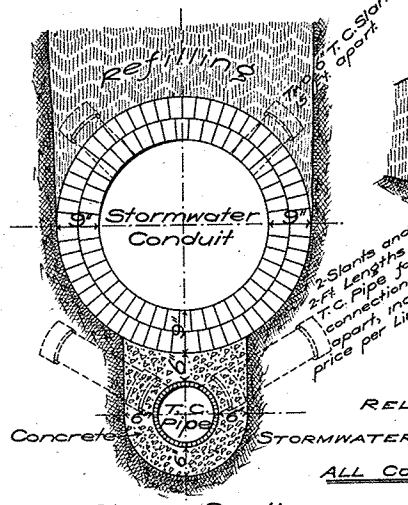
Revised Jan. 1903.

Chief Engineer.

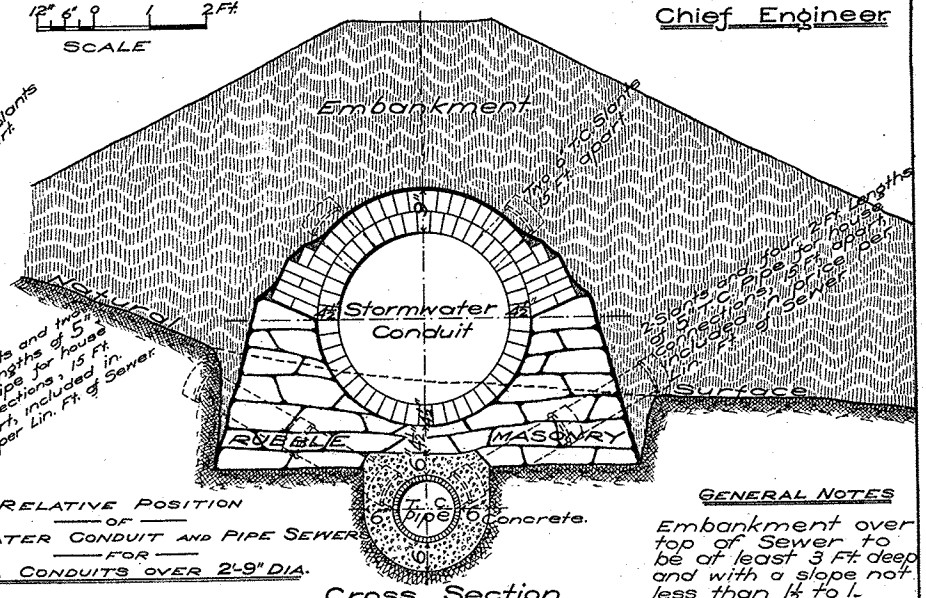


RELATIVE POSITION OF PIPE SEWERS.

SCALE



Cross Section in Hard Earth.



Cross Section in Full Cradle.

RELATIVE POSITION OF STORMWATER CONDUIT AND PIPE SEWERS FOR ALL CONDUITS OVER 2'-9" DIA.

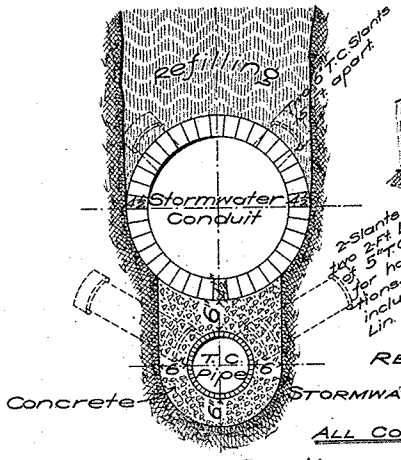
All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets, 12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets, built in Stormwater Conduit only.

Concrete to be not less than 6 inches between outsides of Conduit and Pipe, but may be increased in special cases when required.

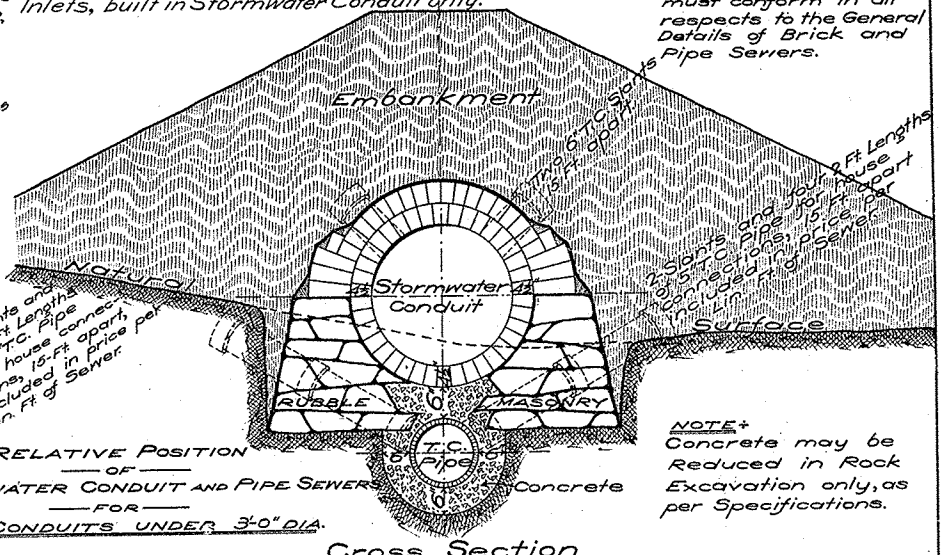
GENERAL NOTES

Embankment over top of Sewer to be of least 3 Ft deep and with a slope not less than 1½ to 1.

The Cross Sections of the Separate System must conform in all respects to the General Details of Brick and Pipe Sewers.



Cross Section in Hard Earth.



Cross Section in Full Cradle.

RELATIVE POSITION OF STORMWATER CONDUIT AND PIPE SEWERS FOR ALL CONDUITS UNDER 3'-0" DIA.

NOTE+ Concrete may be Reduced in Rock Excavation only, as per Specifications.

General Details for Pipe-Sewers.

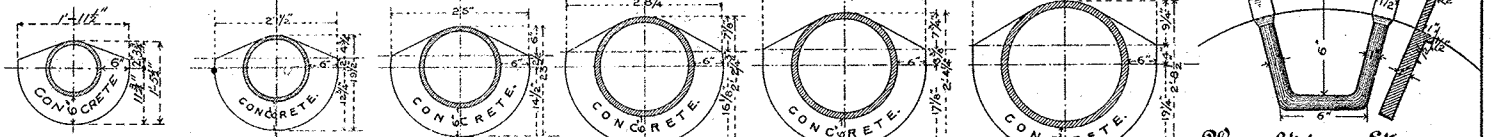
DEPT. OF PUBLIC WORKS
BUREAU OF SURVEYS
January 1897.
Revised Jan. 1903.

City of Philadelphia.

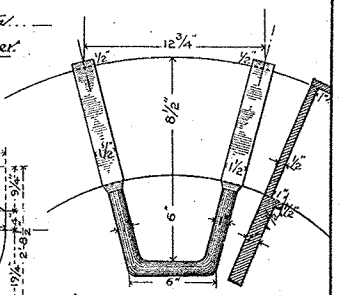
Scale inches 1 2 3 4 3 0 2 3 4 feet

Chief Engineer.

Sections.



Minimum Grade 1.20' p. 100' 10" diam. | Minimum Grade 0.88' p. 100' 12" | Min. Gr. 0.62' p. 100' 15" | Min. Gr. 0.50' p. 100' 18" | Min. Gr. 0.45' p. 100' 20" | Min. Gr. 0.35' per 100' 24"

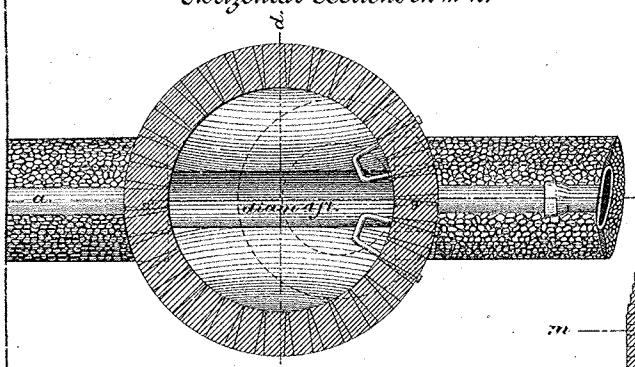


Wrought-iron Steps for Manholes.
To be Galvanized

Sewers must not have less than minimum grades, unless by special directions.
Filling over top of Sewer to be at least three feet deep, and with a slope not less than 1½ to 1.
All Slants for Inlet connections to be 15" dia. for No 1 and No 2 Inlets,
12" dia. for No 3 Inlets, and 8" dia. for No 4 Inlets.
House connections not less than 15 ft. apart on each side by means of single Ys.

Plan of Manhole.

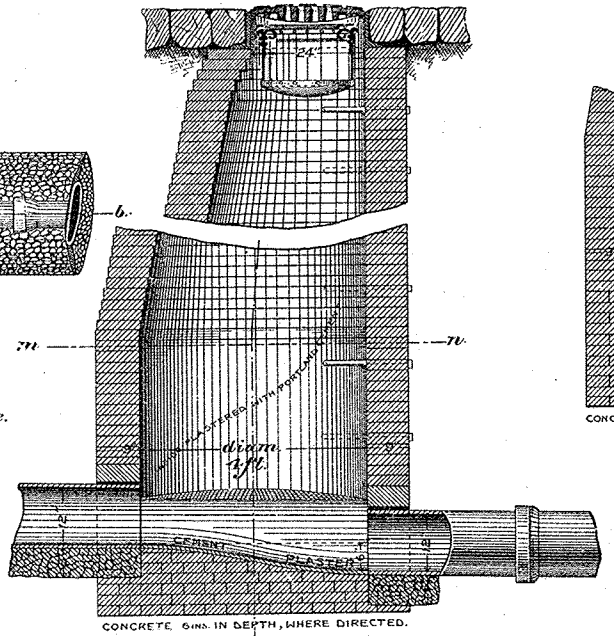
Horizontal Sections on m-n.



The channels in bottom of manholes for sewers on minimum grades may be built on that grade. Manholes on sewers of less than minimum grades must have flushing-gates.

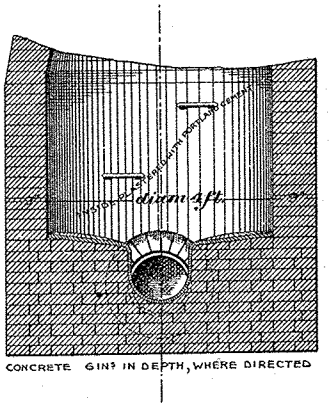
Portland-Cement used for all work inside of manhole.

Section a-b.



The top of pipe sewer must connect with brick-sewer not less than ⅓ its height from inside crown of arch.

Section c-c.



III

General Details for Pipe Sewers,

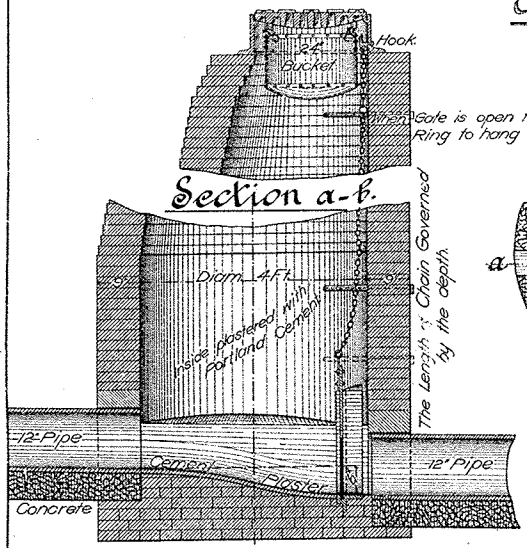
City of Philadelphia,

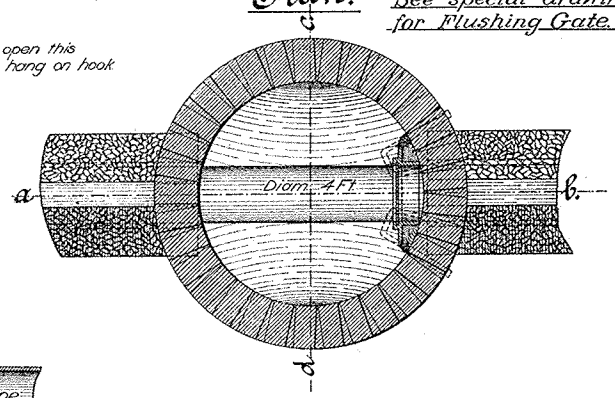
Dept of Public Works.
Bureau of Surveys.

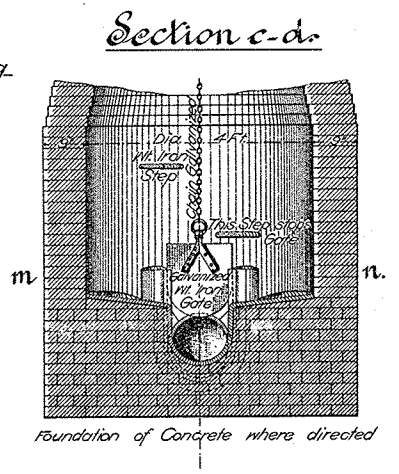
SCALE 0 1' 2' 3'

E. S. Wheeler
Chief Engineer.
Feb. 1895.

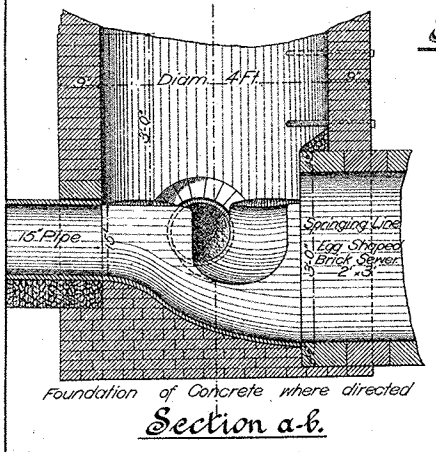
Manhole with Flushing-gate.

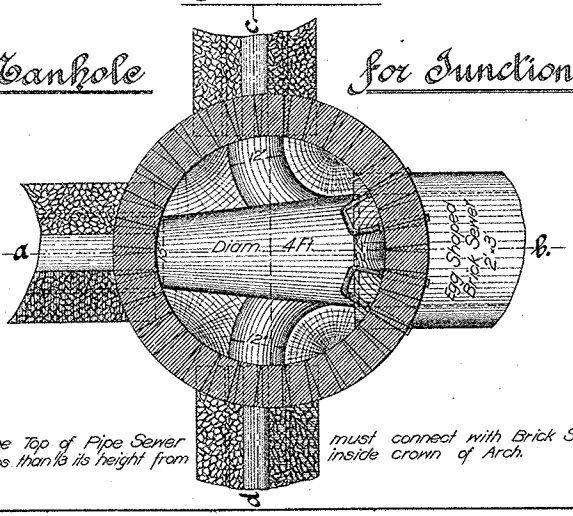




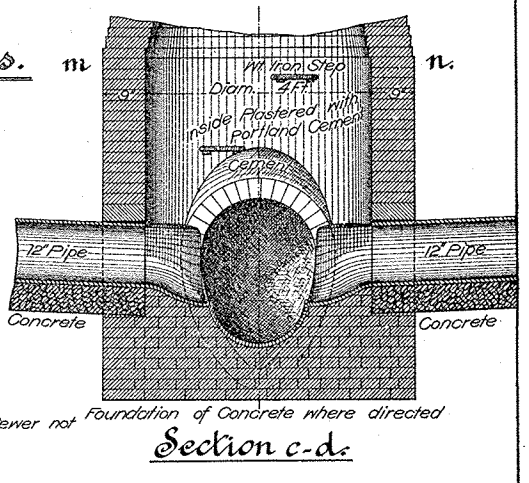


Portland Cement to be used for all work inside of manhole





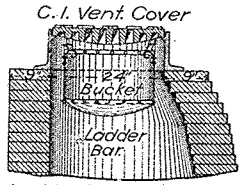
The Top of Pipe Sewer must connect with Brick Sewer not less than ⅛ its height from inside crown of Arch.



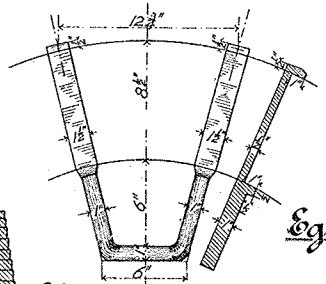
VIII

General Details for Egg-shaped Sewers,

City of Philadelphia.



Ladder Bars to be used where Manhole is less than 3 ft. in dia.

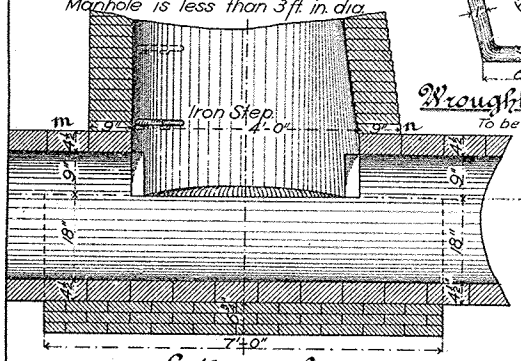


Wrought-iron Steps.
To be Galvanized

DEP't OF PUBLIC WORKS.
BUREAU OF SURVEYS.
FEB. 1895.
Revised Jan. 1903

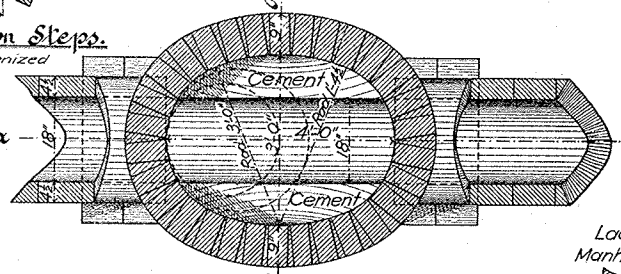
CHIEF ENGINEER.

Manholes for Egg-shaped Sewers 1'6"x2'3" to 2'4"x3'6"

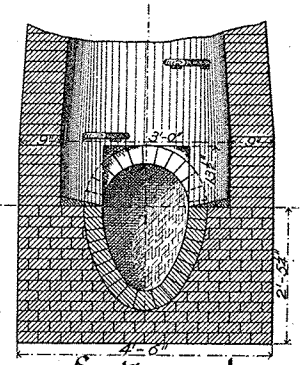


Section a-b.

Foundation of stone or concrete where directed.

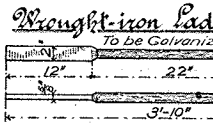


Plan m-n.



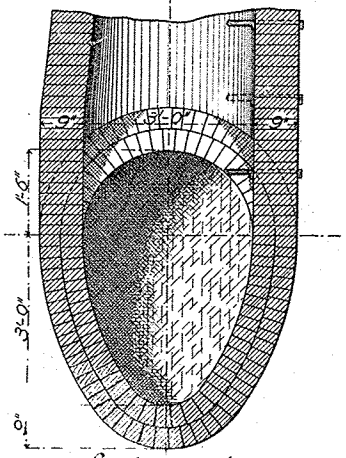
Section c-d.

Ladder Bars to be used where Manhole is less than 3 ft. in diam.

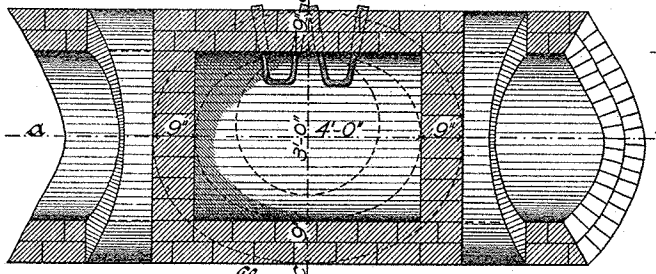


Wrought-iron Ladder Bar.
To be Galvanized

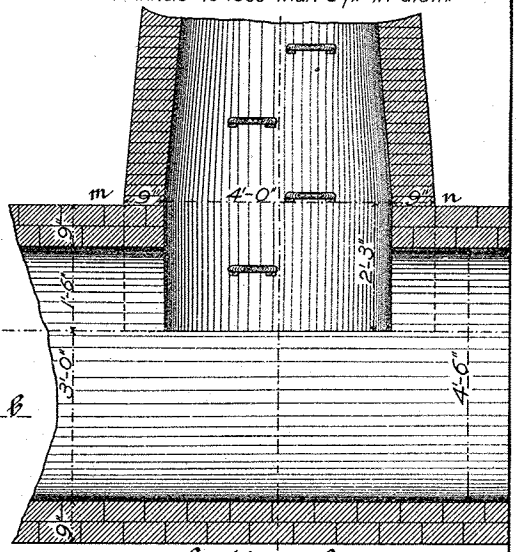
Portland Cement must be used for all work inside of manhole.



Section c-d.



Plan m-n.



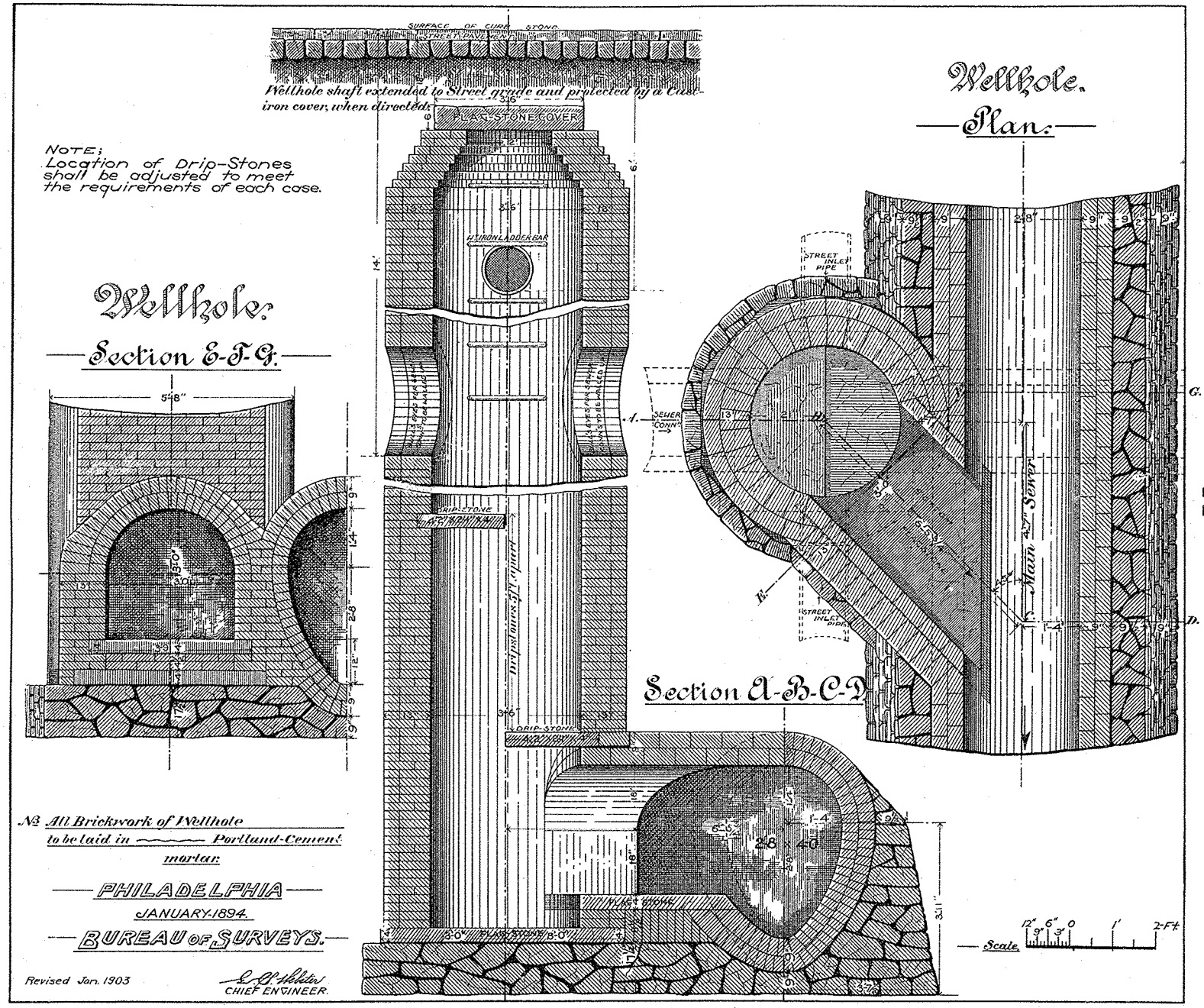
Section a-b.

Foundation of stone or concrete where directed.

Manholes for Egg-shaped Sewers

Chas. Frommer.

XI



NOTE;
Location of Drip-Stones shall be adjusted to meet the requirements of each case.

№ All Brickwork of Wellhole to be laid in ——— Portland-Cement mortar.

PHILADELPHIA
JANUARY-1894.
BUREAU OF SURVEYS.

Revised Jan. 1903

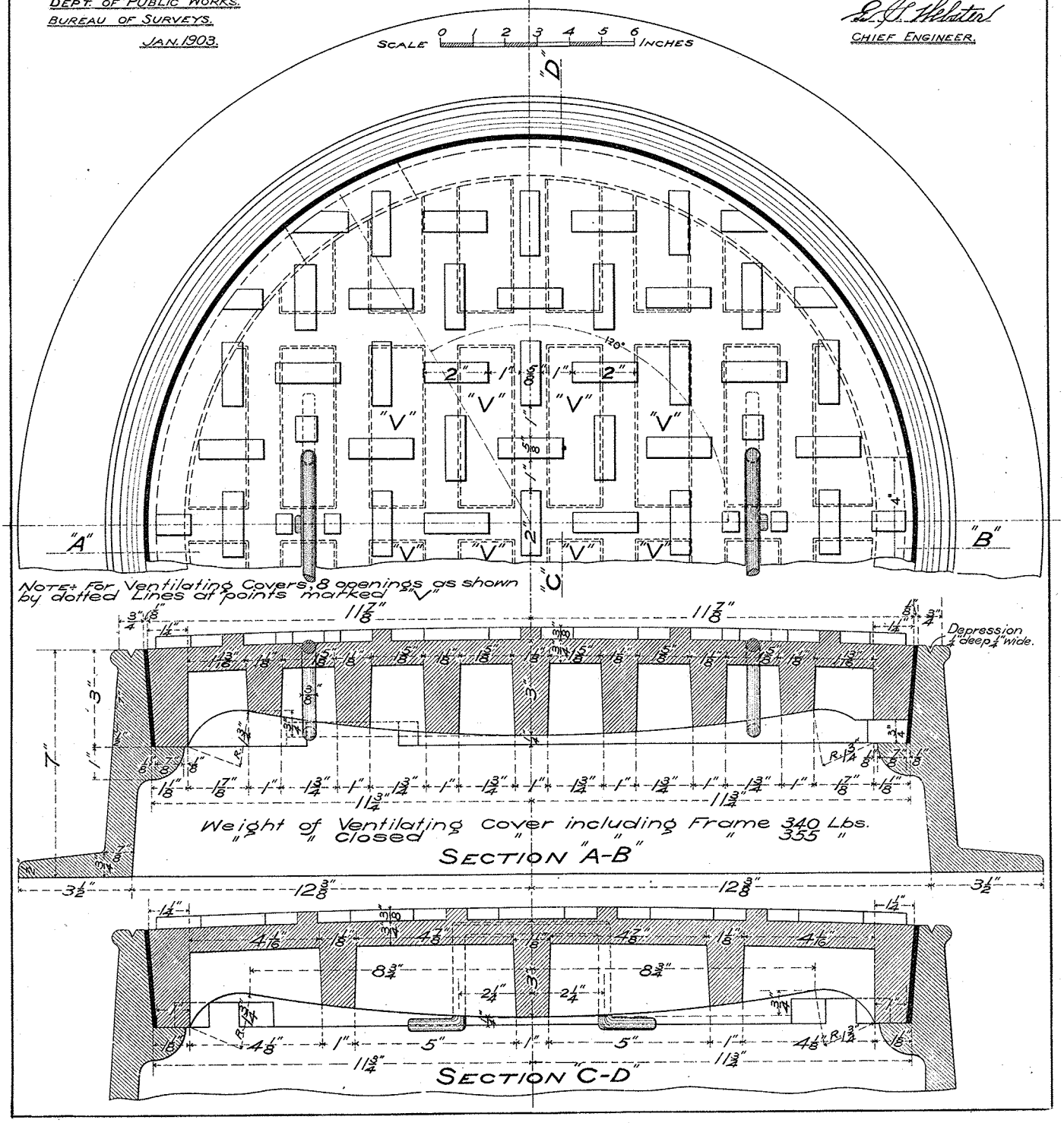
CHIEF ENGINEER.

X

CAST IRON MANHOLE COVER.

DEP'T. OF PUBLIC WORKS.
BUREAU OF SURVEYS.
JAN. 1903.

Ed. H. Webster
CHIEF ENGINEER.



ASPHALTUM FILLED
CAST IRON MANHOLE COVERS AND FRAMES

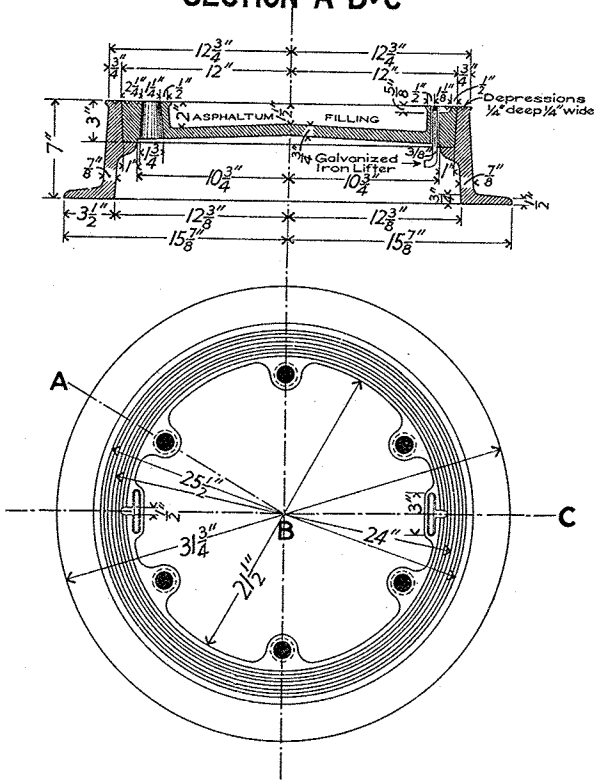
0 3 6 9 12 INS. 1 FT.

SCALE

DEPARTMENT OF PUBLIC WORKS
BUREAU OF SURVEYS
JANUARY 1900

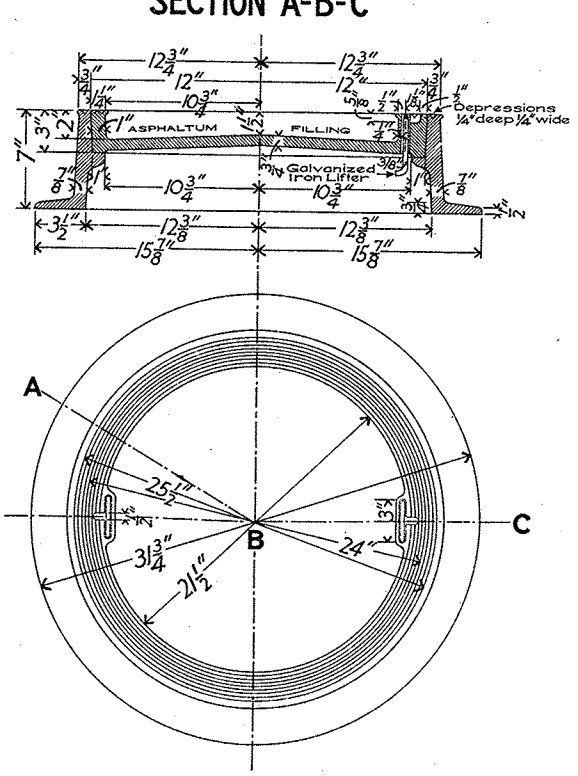
CHIEF ENGINEER

SECTION A-B-C



VENTILATING COVER AND FRAME

SECTION A-B-C



CLOSED COVER AND FRAME

XII

No 1. Open Mouth
Brick and Stone Inlet.

Dept of Public Works Bureau of Surveys

Phila. Jan. 1899.
Revised Jan. 1903.

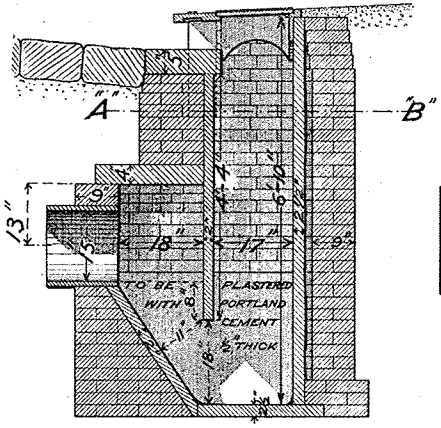
G. Gl. Webster
Chief Engineer

Scales
12" 6" 0" 1ft. FOR INLET
12" 6" 0" 1ft. FOR CASTING

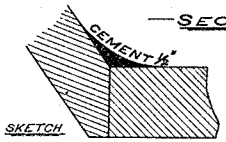
Bill of Flagging for Inlet

Drip Stone	1'-4"×5'-8"×5"
Trap "	4'-4"×5'-4"×2"
Back "	6'-10"×5'-4"×2½"
Cover "	2'-0"×5'-4"×4"
Inclined "	2'-10"×5'-4"×2"
Bottom "	2'-3"×5'-4"×2½"

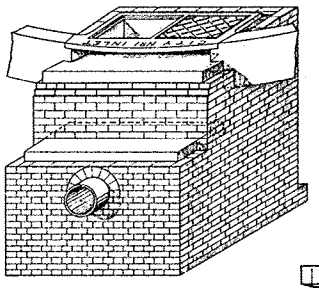
Weight of Castings.
For straight curb 650 lbs
For curved curb 630 lbs



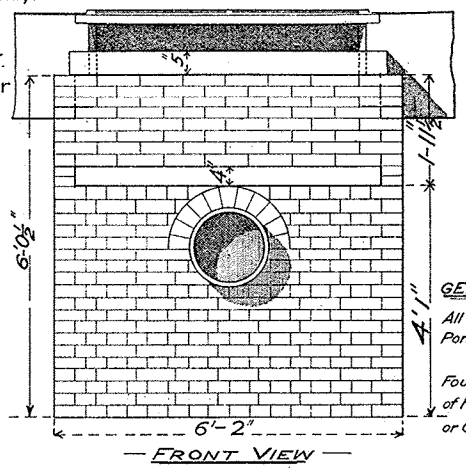
Section "C-D"



Sketch showing manner of joining inclined with bottom stones



Isometrical View



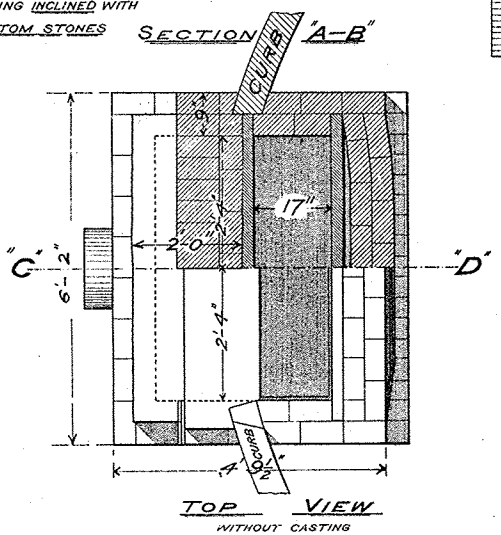
Front View

General Notes

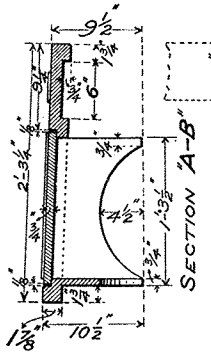
All Brickwork to be laid in Portland Cement Mortar.

Foundation of Inlet to be of Rubble Masonry, Timber or Concrete as directed.

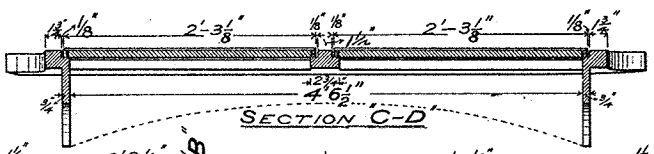
Section "A-B"



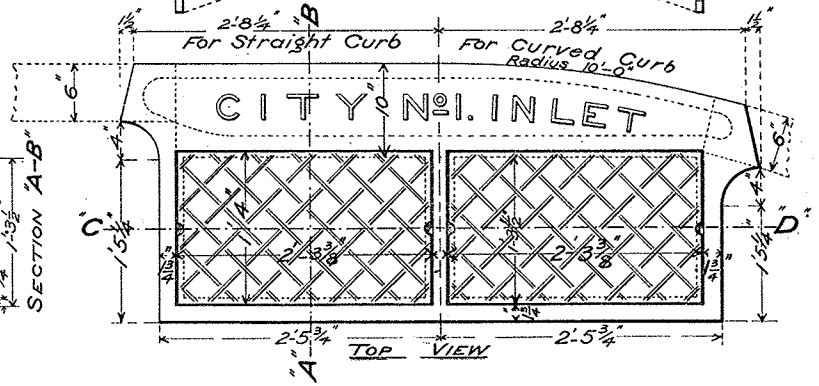
Top View without casting



Details for Casting



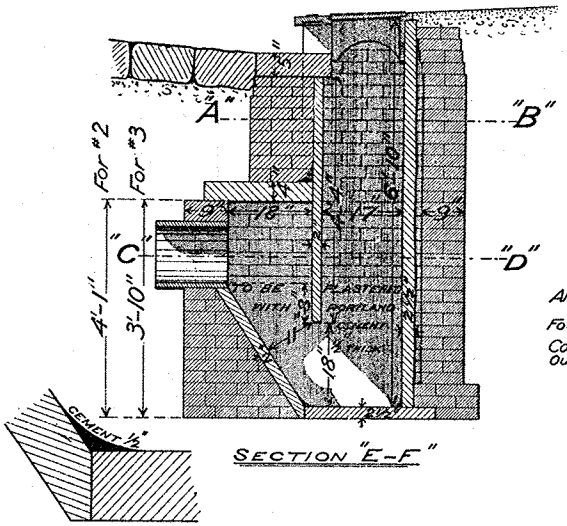
Section C-D



Nº2&3. OPEN MOUTH
BRICK AND STONE INLETS

Dep't of Public Works Bureau of Surveys
Phila. Jan. 1899.
Revised Jan. 1903.

Chief Engineer

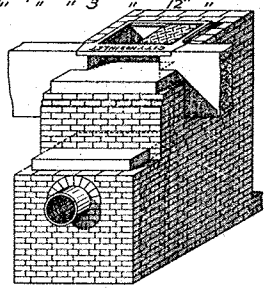


SECTION "E-F"

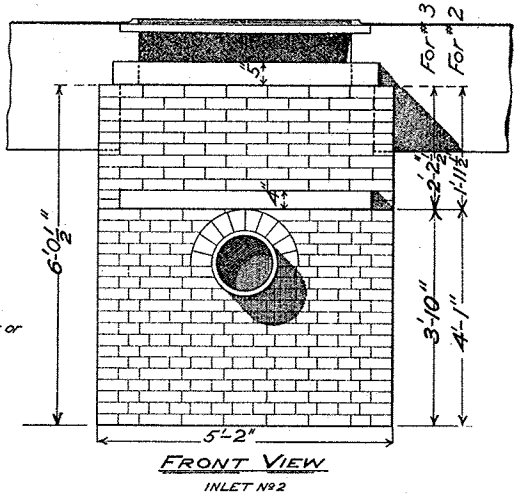
SCALE
12" 6" 0" 1' 2' 3'

GENERAL NOTES

All Brickwork to be laid in Portland Cement Mortar.
Foundation of Inlet to be of Rubble Masonry, Timber or Concrete as directed.
Outlet Pipe for Nº 2 Inlets 15" dia.
" " " " 3 " 12" "



ISOMETRICAL VIEW

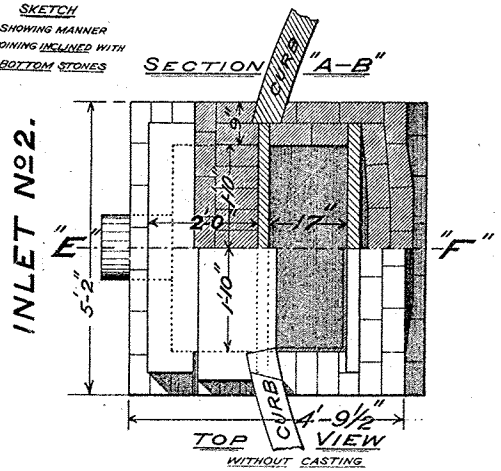


FRONT VIEW
INLET Nº2

SKETCH
SHOWING MANNER OF JOINING INCLINED WITH BOTTOM STONES

SECTION "A-B"

INLET Nº2.



TOP VIEW
WITHOUT CASTING

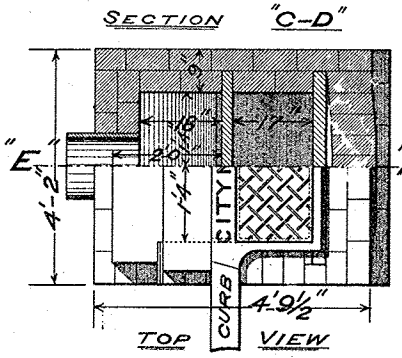
BILL of FLAGGING FOR INLET Nº2.

Drip Stone	1	1'-4" × 4'-8" × 5"
Trap	"	4'-4" × 4'-4" × 2"
Back	"	6'-10½" × 4'-4" × 2½"
Cover	"	2'-0" × 4'-4" × 4"
Inclined	"	2'-10" × 4'-4" × 2"
Bottom	"	2'-3" × 4'-4" × 2½"

BILL of FLAGGING FOR INLET Nº3.

Drip Stone	1	1'-4" × 3'-8" × 5"
Trap	"	4'-4" × 3'-4" × 2"
Back	"	6'-10" × 3'-4" × 2½"
Cover	"	2'-0" × 3'-4" × 4"
Inclined	"	2'-10" × 3'-4" × 2"
Bottom	"	2'-3" × 3'-4" × 2½"

SECTION "C-D"



TOP VIEW

INLET Nº3.

No. 4 Open Mouth Brick and Stone Inlet.

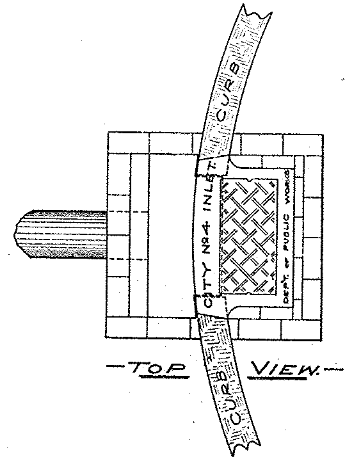
—Dept. of Public Works— —Bureau of Surveys.—

—— Phila. Jan. 1897. ——

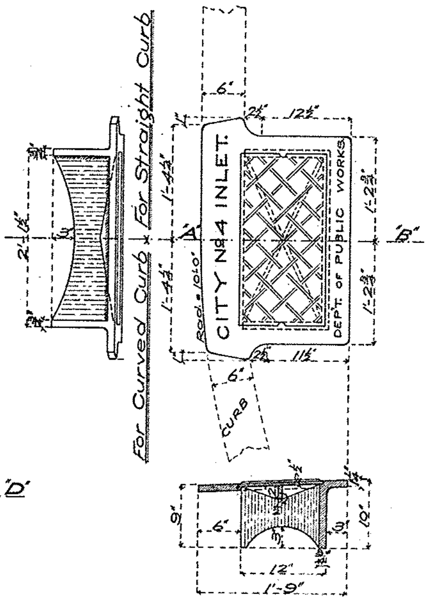
Revised Jan. 1903.

Chief Engineer.

Scales {Inlet. / Casting.

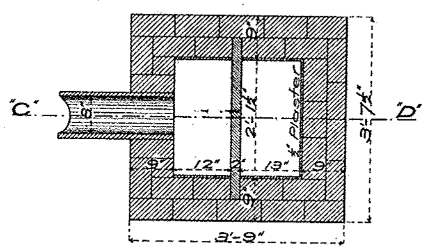


—Top View.—

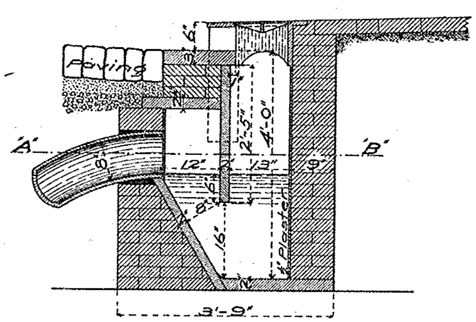


—Section "A-B"—

Details for Casting.



—Section "A-B."—



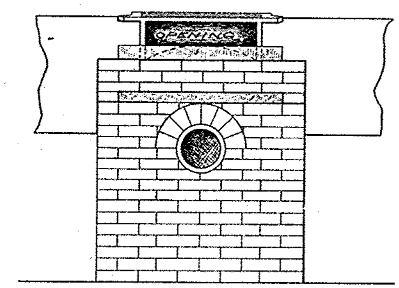
—Section "C-D."—

Bill of Flagging for Inlet.

Trap Stone	2" × 2'-5" × 2'-10"
Bottom "	2" × 2'-0" × 3'-7½"
Inclined "	2" × 2'-5" × 2'-10"
Drip "	3" × 1'-3" × 2'-10"
Cover "	2½" × 1'-4½" × 2'-10"

Weight of Castings.

Straight Curb	230 Lbs.
Curved "	225 "



—Front View.—

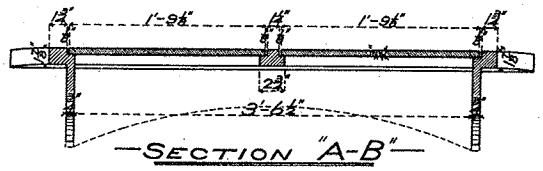
—General Notes—

All Brickwork to be Laid in Portland Cement Mortar.

All Brickwork inside of Inlet to be Plastered with Portland Cement Mortar.

Foundation of Inlet to be Rubble Masonry, Timber, or Concrete when directed.

XV



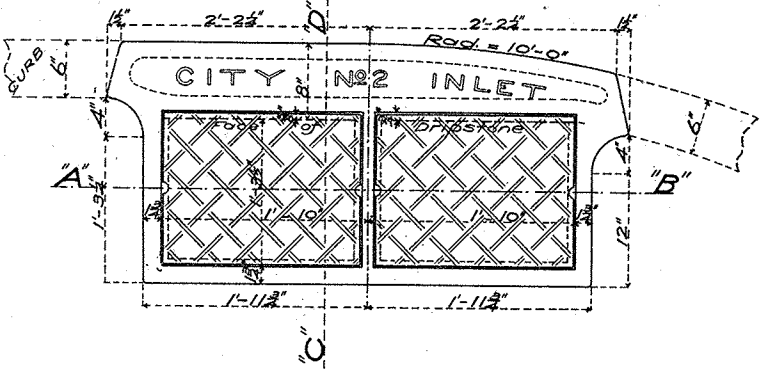
SECTION "A-B"

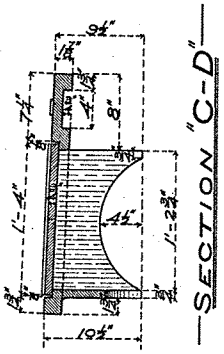
WEIGHTS OF CASTINGS

No 2	Curved	Curb	485 Lbs.
	Straight	"	495 "
No 3	Curved	"	340 "
	Straight	"	345 "

Half Section for Straight Curb

Half Section for Curved Curb





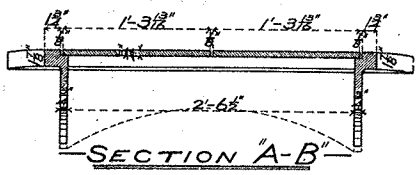
SECTION "C-D"

DETAILS OF CASTINGS FOR No 2 AND No 3 OPEN MOUTH INLETS

Dep't of Public Works — Bureau of Surveys

Phila. Jan. 1897

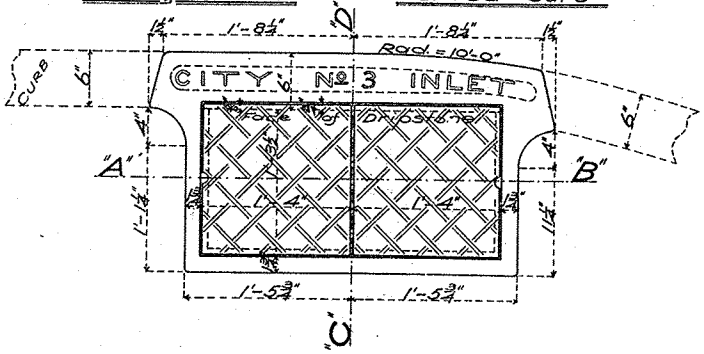
Chief Engineer

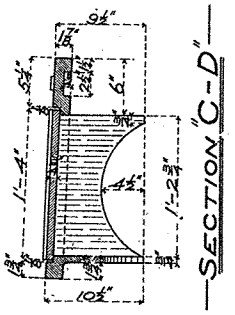


SECTION "A-B"

Half Section for Straight Curb

Half Section for Curved Curb





SECTION "C-D"

Nº 1,2&3. GRATE TOP

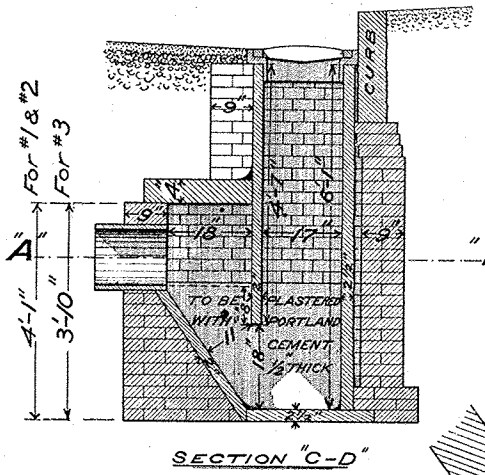
BRICK AND STONE INLETS.

Dept of Public Works Bureau of Surveys

Phila. Jan. 1899

H. G. Webster

Chief Engineer



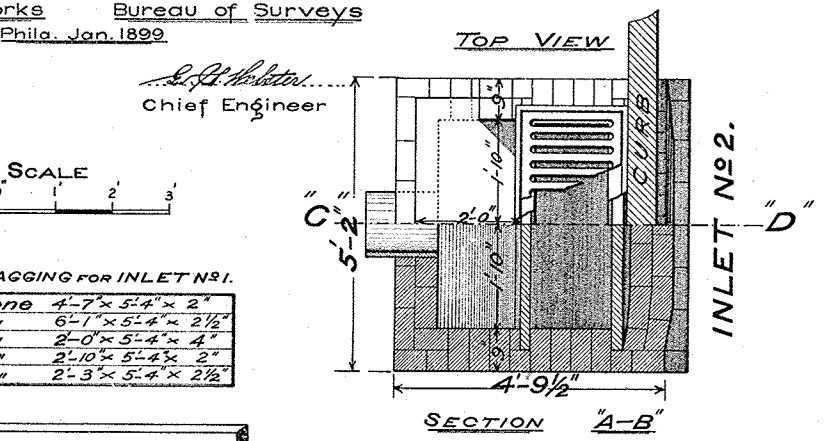
SECTION "C-D"

SCALE

12" 9 6 3 0 1' 2' 3'

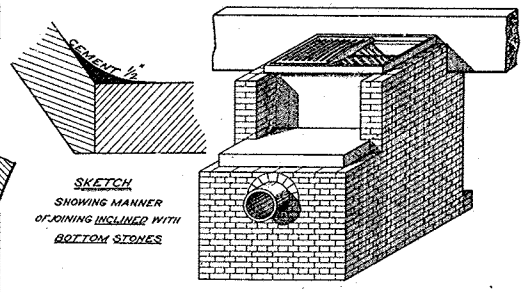
BILL of FLAGGING for INLET Nº 1.

Trap Stone	4'-7"	× 5'-4" × 2"
Back "	6'-1"	× 5'-4" × 2½"
Cover "	2'-0"	× 5'-4" × 4"
Inclined "	2'-10"	× 5'-4" × 2"
Bottom "	2'-3"	× 5'-4" × 2½"



INLET Nº 2.

SECTION "A-B"



SKETCH SHOWING MANNER OF JOINING INCLINED WITH BOTTOM STONES

ISOMETRICAL VIEW

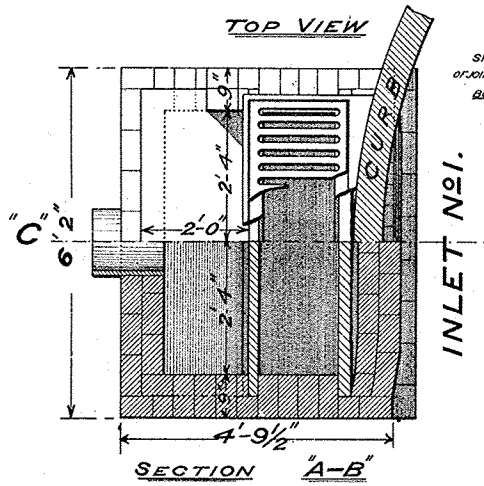
GENERAL NOTES

All Brickwork to be laid in Portland Cement Mortar.

Foundation of Inlet to be of Rubble Masonry, Timber or Concrete as directed.

Outlet Pipe for Nos. 1 & 2 Inlets 15" dia.

" " " " 3 " 12" "



INLET Nº 1.

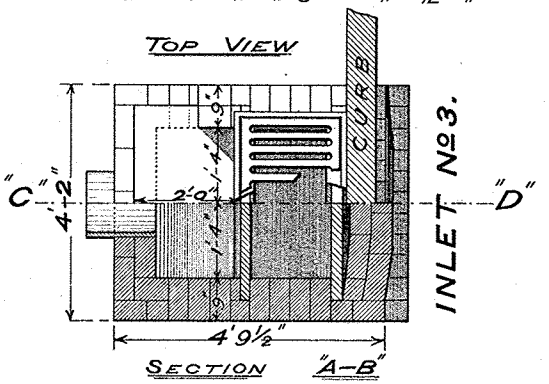
SECTION "A-B"

BILL of FLAGGING for INLET Nº 2.

Trap Stone	4'-7"	× 4'-4" × 2"
Back "	6'-1"	× 4'-4" × 2½"
Cover "	2'-0"	× 4'-4" × 4"
Inclined "	2'-10"	× 4'-4" × 2"
Bottom "	2'-3"	× 4'-4" × 2½"

BILL of FLAGGING for INLET Nº 3.

Trap Stone	4'-7"	× 3'-4" × 2"
Back "	6'-1"	× 3'-4" × 2½"
Cover "	2'-0"	× 3'-4" × 4"
Inclined "	2'-10"	× 3'-4" × 2"
Bottom "	2'-3"	× 3'-4" × 2½"



INLET Nº 3.

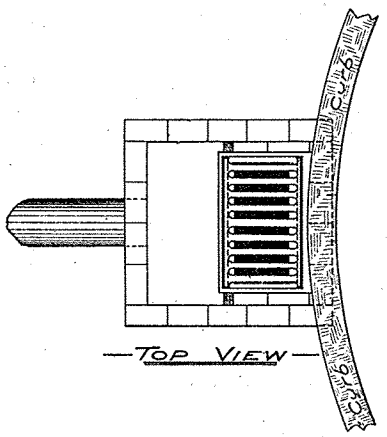
SECTION "A-B"

No. 4 GRATE TOP
BRICK AND STONE INLET

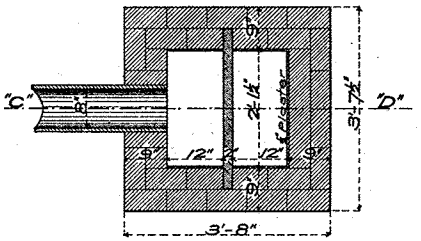
— Dep't. of Public Works — — Bureau of Surveys. —
— Phila. Jan. 1897. —

Chief Engineer.

Scales { Inlet 12" 6" 0 1 Ft.
Casting 12" 6" 0 1 Ft.



— TOP VIEW —

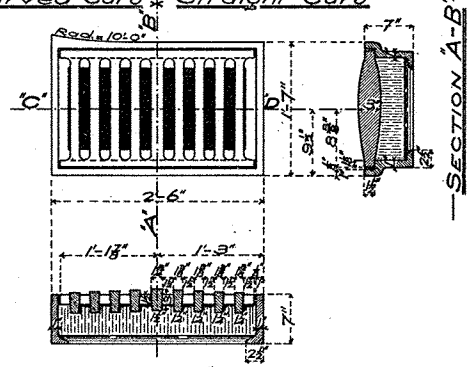


— SECTION "A-B" —

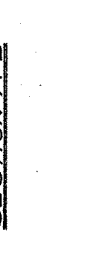
DETAILS OF CASTING

— For —

Curved Curb * Straight Curb



— SECTION "C-D" —



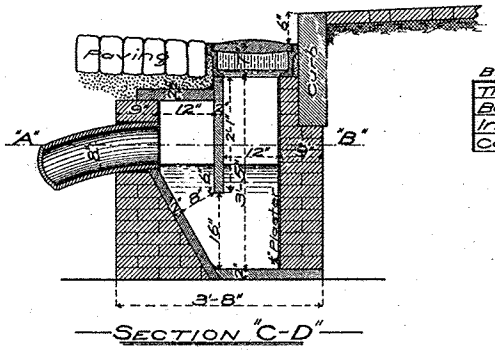
— SECTION "A-B" —

— GENERAL NOTES —

All Brickwork to be Laid in Portland Cement Mortar.

All Brickwork inside of Inlet to be Plastered with Portland Cement Mortar.

Foundation of Inlet to be Rubble Masonry, Timber, or Concrete when directed.

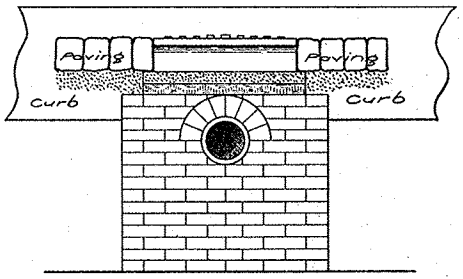


— SECTION "C-D" —

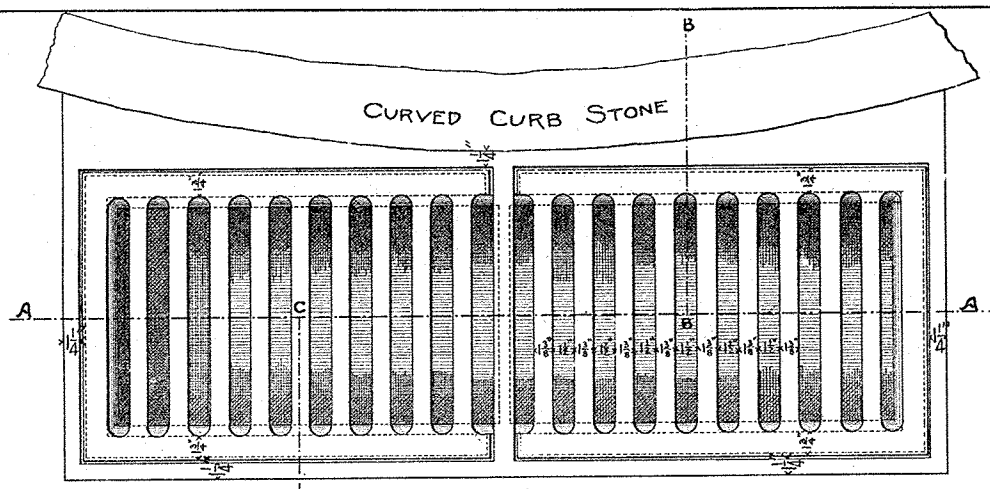
BILL OF FLAGGING FOR INLET.

Trap Stone	2" × 2'-1" × 2'-10"	
Bottom "	2" × 2'-0" × 3'-7½"	
Inclined "	2" × 2'-5" × 2'-10"	
Cover "	2½" × 1'-4½" × 2'-10"	

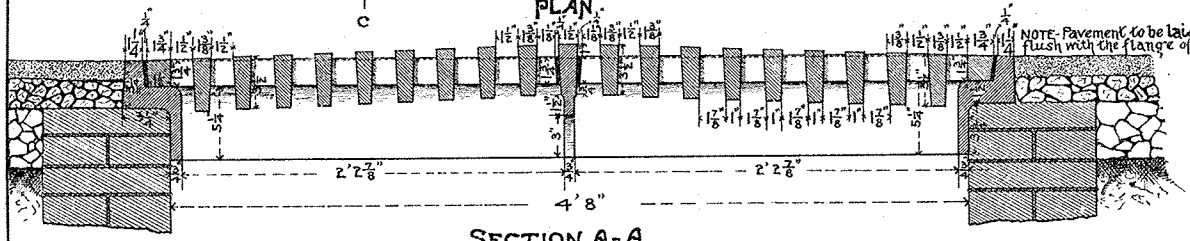
WEIGHT OF GRATING INCLUDING FRAME 315 LBS.



— FRONT VIEW —



PLAN.



SECTION A-A

DESIGN FOR GRATE TOP
BRICK & STONE INLET
No 1

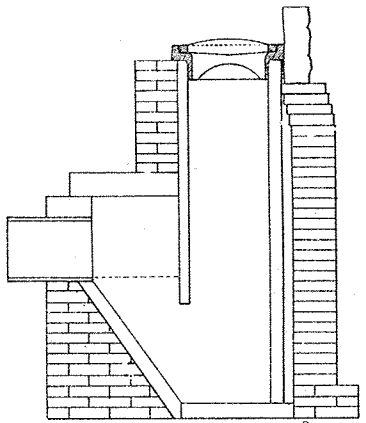
DEPT. OF PUBLIC WORKS
BUREAU OF SURVEYS
PHILADELPHIA

NOVEMBER 1893

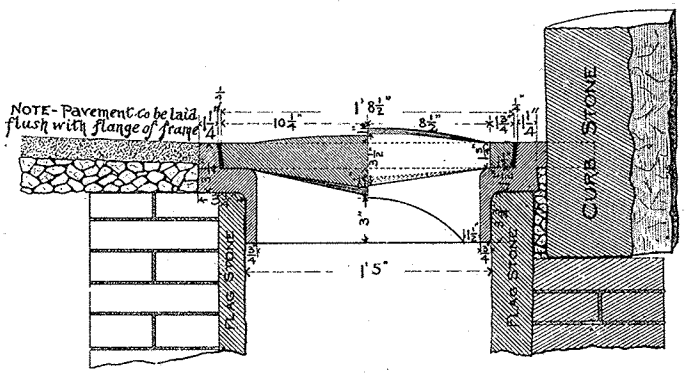
CHIEF ENGINEER

FEET- 0 1
SCALE-
INCHES- 0 1 2 3 4 5 6 7 8 9 10 11 12

Weight of grating including frame 820 lbs



SCALE FEET 0 1 2
INCHES 3 6 9 12



SECTION C-C SECTION B-B

XIX

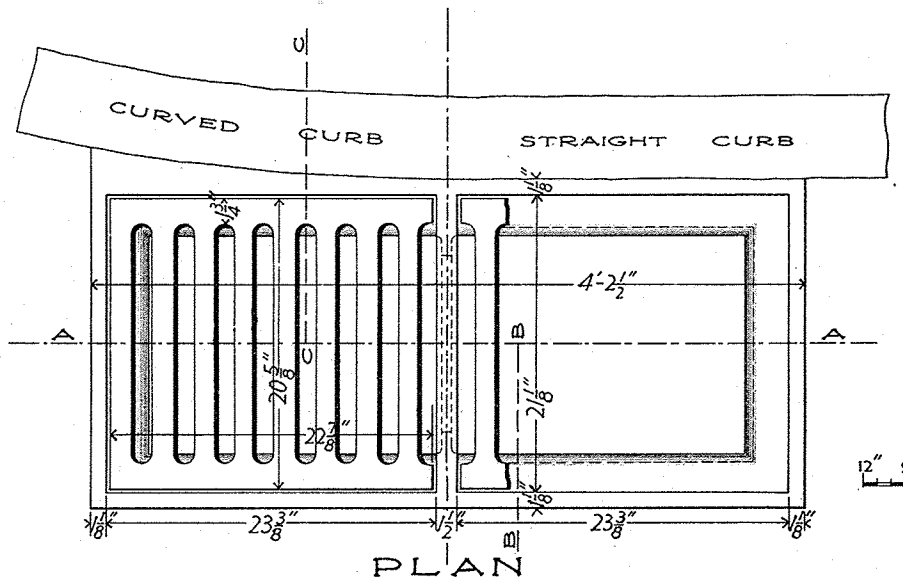
DESIGN FOR GRATE TOP

BRICK & STONE INLET

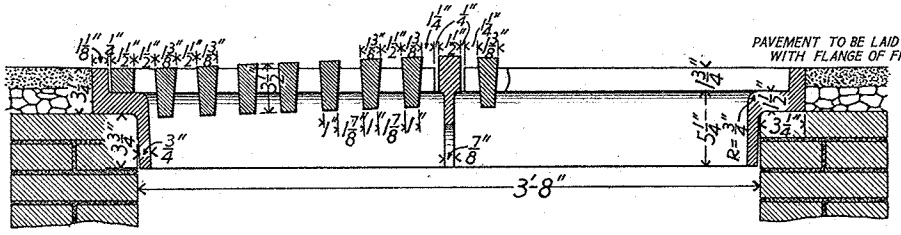
— No 2. —

DEPARTMENT OF PUBLIC WORKS
BUREAU OF SURVEYS
JANUARY 1900

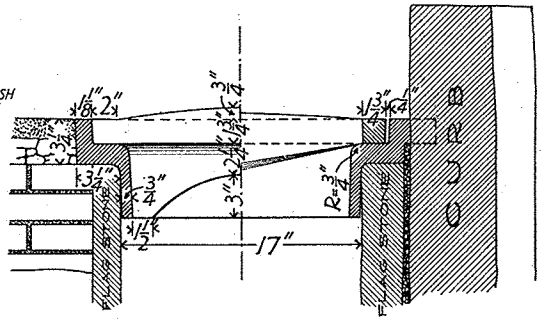
CHIEF ENGINEER



PLAN



SECTION A-A

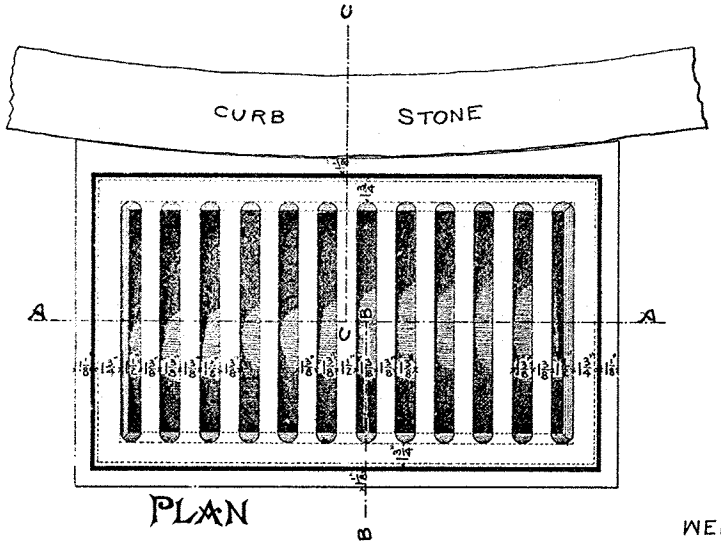


SECTION B-B SECTION C-C

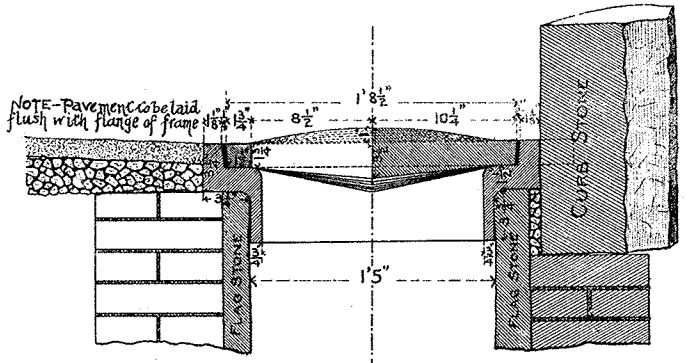
SCALE 12" 9 6 3 0 1 FT.

WEIGHT OF FRAME AND GRATE 650 LBS.

XX

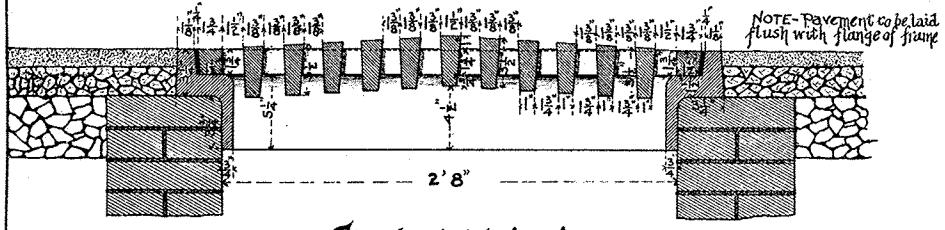


PLAN

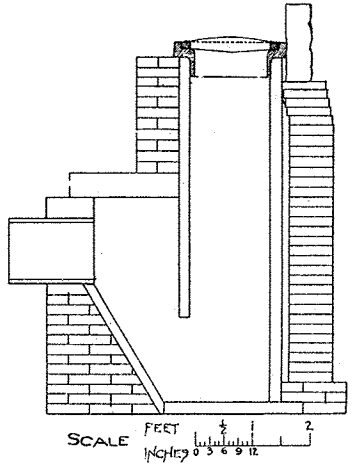


SECTION B-B | SECTION C-C

WEIGHT OF GRATING INCLUDING FRAME COMPLETE 490 LBS.



SECTION A-A



DESIGN FOR GRATE TOP

BRICK & STONE INLET No 3

DEPT. OF PUBLIC WORKS

BUREAU OF SURVEYS

PHILADELPHIA

SCALE FEET 0 1
INCHES 0 1 2 3 4 5 6 7 8 9 10 11 12

DECEMBER 1893

CHIEF ENGINEER

XXI