

REINFORCED CONCRETE CONSTRUCTION FOR HYDRAULIC FLUMES.

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3 SHEETS-SHEET 1.

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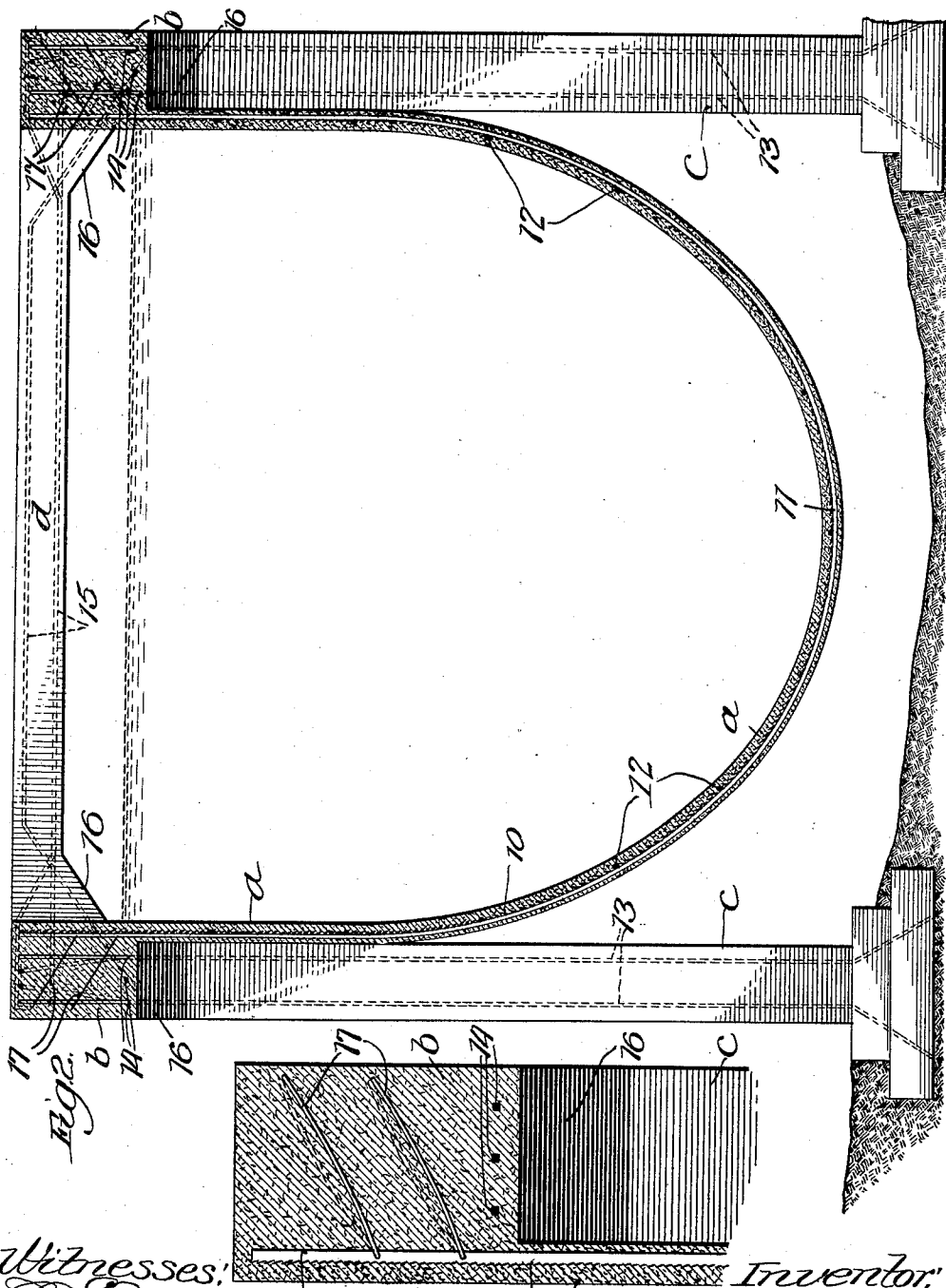
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3 SHEETS-SHEET 2.

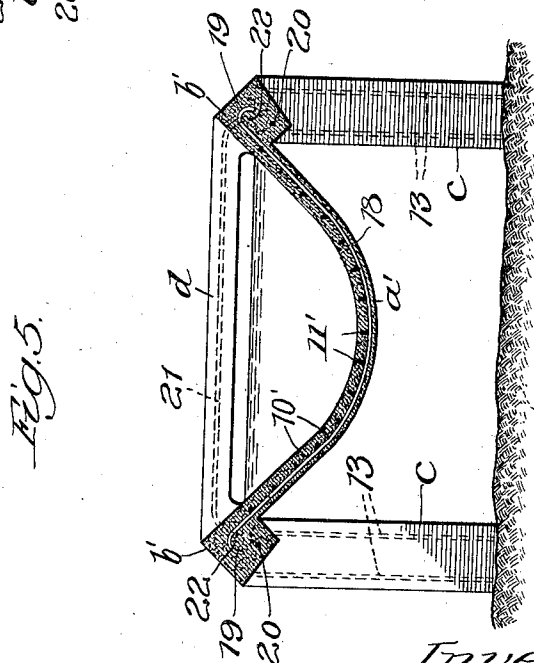
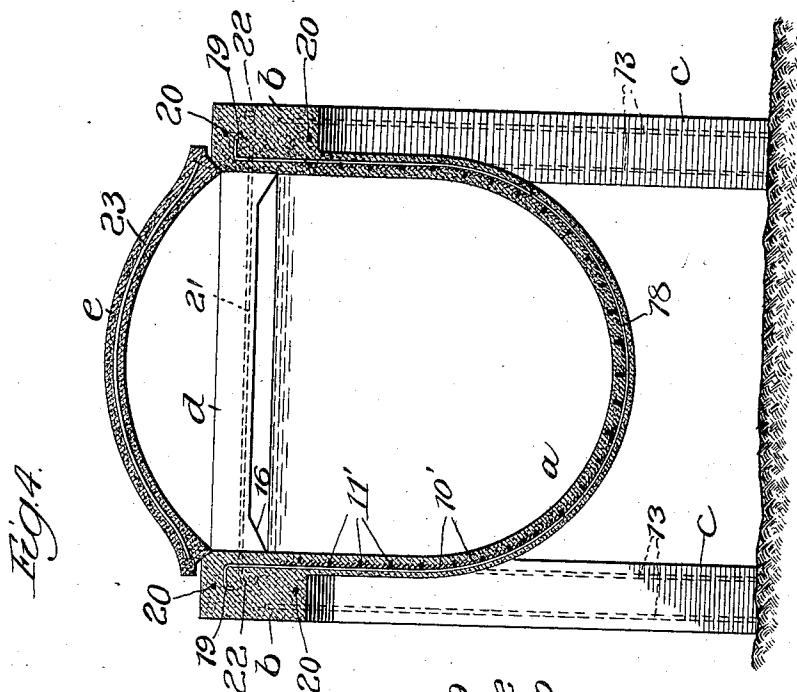


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Fig. 3.

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UNITED STATES PATENT OFFICE.

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REINFORCED CONCRETE CONSTRUCTION FOR HYDRAULIC FLUMES.

1,030,839.

Specification of Letters Patent.

Patented June 25, 1912.

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To all whom it may concern:

Be it known that I, WILFRED P. BRERETON, a citizen of the United States, and a resident of Portland, county of Multnomah, State of Oregon, have invented certain new and useful Improvements in Reinforced Concrete Constructions for Hydraulic Flumes, of which the following is a full, clear, and exact description.

10 The invention relates to hydraulic flumes and seeks to provide an improved construction in which the body portion comprises concrete plastered upon an open mesh steel fabric which has been previously bent into
15 shape and suspended between side supporting beams. The flume body of reinforced concrete is water-proofed within by a suitable material and the body, together with the side beams, upright supports and other
20 parts are preferably all formed of reinforced concrete.

The improvement will be more fully understood from the following description and the accompanying drawings.

25 In the drawings, Figure 1 is a side elevation of the improved flume construction with parts broken away and parts shown in longitudinal, central section. Fig. 2 is a cross-section on the line 2 of Fig. 1. Fig. 3
30 is a detail section on the line 3 of Fig. 1. Figs. 4 and 5 are cross sections of other forms.

The flume body *a* is suspended in hammock like fashion between side beams *b*
35 which, in the form shown, are supported upon columns *c* and connected at intervals by transverse bracing beams *d*.

The flume body *a* of reinforced concrete is quite thin and comprises concrete or like composition which is coated or plastered
40 over a reinforcing, open mesh metal fabric 10 which is preferably formed of steel. Preferably, also, the open mesh fabric is made of expanded sheet steel, usually known
45 as "expanded metal," but any suitable steel mesh may be employed. The flume body is also preferably reinforced by parallel transverse ribs 11 spaced at uniform distances
50 apart and by a number of parallel, uniformly spaced rods 12 extending longitudinally of the flume body. The fabric 10 and the longitudinal rods 12 are secured to the transverse ribs 11 before the reinforcing portions of the flume body are plastered
55 with the concrete composition. Also, before

the concrete coating is applied, the transverse ribs and the steel mesh are bent preferably to substantially the form that would naturally obtain with a loaded flexible support suspended at its ends or to what is known as a hydraulic curve. The flume
60 body portion *a* is given the desired form by bending the metallic reinforcing mesh 10 and also the ribs 11 into the shape corresponding to a hydraulic curve or to substantially such a curve. After the reinforcing
65 portions of the flume body are properly shaped, they are suspended between the side supports and the concrete composition is plastered thereon. Thereafter, the flume
70 body is water-proofed in any suitable manner, for example, by coating the inner surface with asphaltum. A flume body so constructed is, comparatively speaking, inexpensive and the load will be uniformly distributed over the flume body, so that no
75 undue strain is concentrated upon any portion thereof. Preferably, the supporting side beams *b*, cross-beams *d* and columns *c* are also formed of reinforced concrete and
80 are built up in the usual manner within suitable molds or forms. In the construction shown in Figs. 1, 2 and 3, the columns *c* are reinforced with a series of vertical rods 13 embedded therein and the beams *b*
85 and *d* are reinforced by rods 14 and 15, respectively. The cross beams *d* are arranged in line with the columns *c* and preferably inclined bracing portions 16 of concrete are interposed between the upper ends of the
90 columns and the lower sides of the beams *b* and *d*. In the construction shown, each of the longitudinal side beams *b* is provided with three reinforcing rods 14 extending
95 through the lower portion thereof and two of these rods are bent upwardly at the intersection of the side beams with the columns and cross beams. Each cross beam *d* is provided with three reinforcing rods 15, one
100 near its upper portion and two near its lower portion. The upper rod is bent downwardly at the ends of the cross beams and one of the lower rods is bent upwardly.

It should be understood that the construction and arrangement of the side beams between which the flume body is suspended
105 and of the means for supporting and bracing the side beams may be widely varied without departure from the broad scope of the invention.

110

In the form shown in Figs. 1, 2 and 3, the connection between the supporting beams *b* and the body of the flume is effected by a series of looped U-shaped rods 17 which extend through openings in the upper ends of the ribs 11 of the flume body and are embedded in the concrete body of the side beams *b*, as shown. Preferably, the connecting loops or U-shaped pieces 17 are inclined upwardly and outwardly from the ribs 11. By embedding the upper ends of the ribs and the U-shaped loops in the concrete beams *b*, as the latter are constructed or built up within the forms, the reinforcement, which has been previously shaped, as described, is suspended in hammock-like fashion between the side beams, and the comparatively thin covering of concrete or like composition is then applied to the suspended reinforcement to complete the flume body. To prevent the water from seeping through the concrete, the inner surface of the flume body *a* is coated with a suitable water-proofing material such as asphaltum. Preferably the ribs 11 are integral with the expanded metal 10, and, in the form shown in Figs. 4 and 5, the expanded metal 10' is so shaped that the integral ribs 11' thereof run longitudinally of the flume and the reinforcement is supported from the side beams *b* by U-shaped rods 18, the ends of which extend within and are embedded in the side supporting beams *b*. The ends of the U-rods 18 are preferably provided with offset hook portions 19. The flume body *a*, in the form shown in Fig. 4, is of a shape substantially similar to that shown in Figs. 1, 2 and 3, but, as this construction is designed for a smaller flume, the lower curved portion of the flume body is substantially semi-circular. In this form, the side beams *b* are reinforced by two rods 20 arranged near their upper and lower edges. The transverse beams *d* are reinforced by rods 21 extending longitudinally through their lower end portions and are provided with hooked ends 22 embedded in the side beams. An arch cover *e*, which is preferably formed in removable sections, rests upon the beams *b* and is suitably reinforced by rods 23.

The flume body *a'* shown in Fig. 5, like the other form, is suspended in like fashion between the side beams, but the upper side portions of the flume body instead of being substantially parallel, incline upwardly and outwardly. The side beams *b'* are arranged with their side faces correspondingly inclined, as shown. This form is intended for use in cold climates and the walls are outwardly inclined so that ice forming upon the surface of the body of water will not exert an undue pressure upon the sides of the flume.

It is obvious that numerous changes may

be made in the details set forth without departure from the essentials of the invention as defined in the claims.

I claim as my invention:—

1. A hydraulic flume comprising suitably supported side beams and a body portion suspended in hammock-like fashion between said beams and comprising concrete coated upon a reinforcing metal mesh fabric.

2. A hydraulic flume comprising suitably supported side beams and a body portion of water-proofed, reinforced concrete, suspended between said beams in substantially the form of a hydraulic curve.

3. In a hydraulic flume, the combination with suitably supported side beams, of a flume body of curved cross section suspended between said beams and comprising a reinforcing mesh-fabric of metal plastered with a concrete composition.

4. In a hydraulic flume, the combination with suitably supported side beams, of a body portion suspended in hammock-like fashion between side beams and comprising a reinforcing mesh-fabric of steel covered with a relatively thin coating of water-proofed concrete.

5. In a hydraulic flume, the combination of suitably supported side beams formed of reinforced concrete, a reinforced concrete flume body suspended between said side beams, and rods connected to the reinforcement of said flume body and embedded within said side beams.

6. In a hydraulic flume, the combination of side beams, columns supporting said side beams, cross beams extending between said side beams and columns, and a body portion of curved cross section suspended between said side beams, said columns, said beams and said body portion being formed of reinforced concrete.

7. In a hydraulic flume, the combination of suitably supported side beams formed of reinforced concrete, a flume body suspended in hammock like fashion between said side beams and comprising a reinforcing mesh fabric of steel plastered with a concrete composition, and rods connected to said reinforcing mesh fabric and embedded within said side beams.

8. In a hydraulic flume, the combination of suitably supported side beams formed of reinforced concrete, a flume body substantially in the form of a hydraulic curve in cross section suspended between said side beams and comprising a metal mesh fabric covered with concrete, transverse ribs and longitudinal strengthening rods embedded in the concrete covering of said fabric, the ends of said ribs being embedded in said supporting side beams.

9. In a hydraulic flume, the combination with suitably supported side beams, of a body portion of curved cross section sus-

pended between said side beams and comprising a metal mesh-fabric and reinforcing rods plastered with a relatively thin coating of concrete.

5 10. In a hydraulic flume, the combination with suitably supported side beams, of a body portion of substantially the form of a hydraulic curve in cross section suspended between said side beams and comprising a

metal mesh-fabric covered with concrete 10 with transverse ribs and longitudinal strengthening rods embedded in said concrete covering.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
