No. 851,408. PATENTED APR. 23, 1907.

A. O. CUNNINGHAM.

BRIDGE ABUTMENT.

APPLICATION FILED JULY 5, 1904.

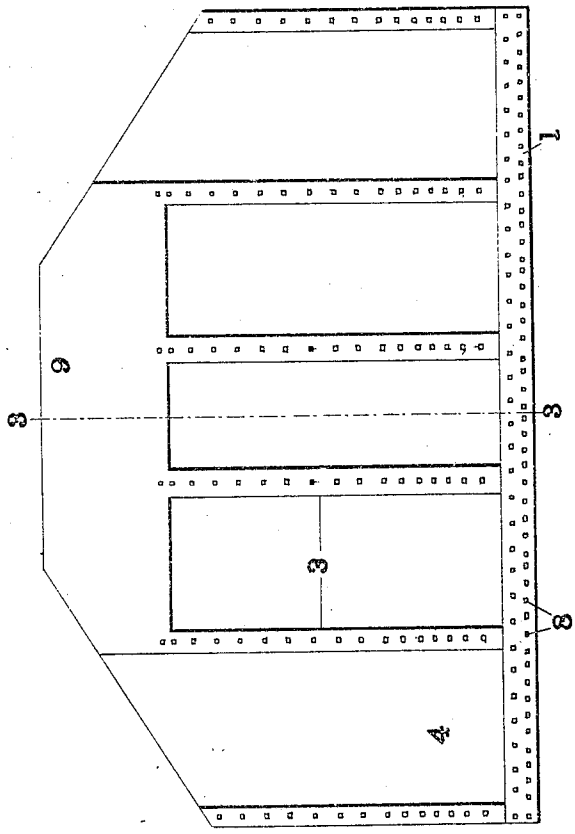


Fig. 1.

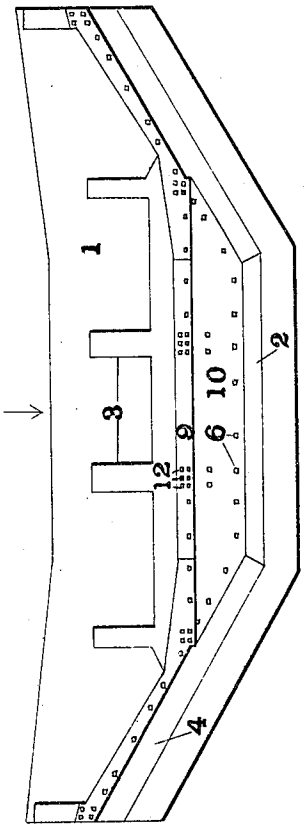


Fig. 2.

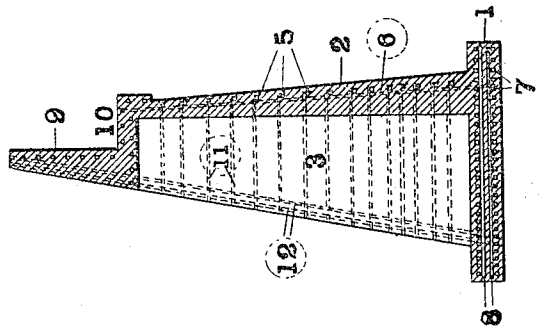


Fig. 3.

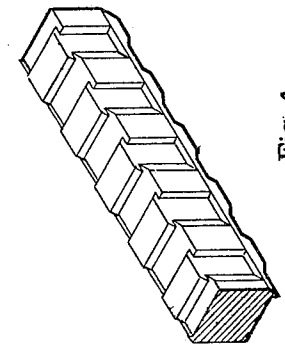


Fig. 4.

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BRIDGE-ABUTMENT.

No. 851,408. Specification of Letters Patent. Patented April 23, 1907.

Application filed July 5, 1904. Serial No. 215,215.

To all whom it may concern:

Be it known that I, ANDREW O. CUNNINGHAM, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Bridge-Abutments, of which the following is a specification.

My invention relates to constructions of concrete and metal and has for its principal objects to adapt this style of construction for use for abutments, piers, dams, walls and similar constructions; also to secure a maximum strength of structure with the greatest economy of labor and material.

It consists principally in forming the abutment or other construction with hollow spaces surrounded wholly or in part with metal-reinforced concrete; it also consists in the arrangement and distribution of the concrete and metal hereinafter described.

In the accompanying drawing, which forms part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a rear elevation of an abutment embodying my invention; Fig. 2 is a plan thereof; Fig. 3 is a vertical cross section thereof; Fig. 4 is a detail of a reinforcing bar;

My abutment is built of concrete reinforced with metal bars arranged to take up the tensile stresses therein. This construction comprises a footing 1, a face wall 2 built near the outer side thereof and walls 3 transverse to said face wall and extending to near the inner side of said footing. The inner side of the footing extends in a substantially continuous line nearly parallel with the face wall, whereby the footing is continuous between the transverse walls. The abutment is preferably provided with wings 4 arranged at an angle in accordance with common practice and strengthened with transverse walls resting on the footing.

All of the walls are made of concrete, and are built up in the usual centering or false work. The face wall and the wings preferably have the usual batter. The transverse walls are of such thickness and extend backwardly from the face wall to such a distance as may be necessary to support the load or stress to which they are subjected. The tops of the several walls are decked over by a slab of concrete which forms the bridge seat or top portion of the abutment. In the lower portion of this mass are embedded a series of bars or other reinforcing metal. Preferably corrugated bars of the form illustrated in Fig. 4 and fully described in an application of A. L. Johnson for Letters Patent therefor No. 194,362, filed February 19, 1904, are used for reinforcing the several portions of the construction.

The face wall has two series of reinforcing bars embedded therein near the outer face thereof, the bars 5 of one series being arranged horizontally and those 6 of the other series being arranged vertically. In like manner the footing has two series of reinforcing bars embedded therein near both its upper and lower surfaces, the bars 7 of one series near each surface being arranged longitudinally and the bars 8 of the other series being arranged transversely. Either series of bars may be dispensed with or all of the bars may be placed near the upper or lower surface, the distribution of the bars varying with the computed stresses to which the footing will be subjected.

The rear ends of the transverse walls incline upwardly to the parapet wall which is built up back of the bridge seat. These transverse walls have reinforcing metal embedded therein near their rear faces. The bars in the transverse walls are thus arranged with considerable upward inclination and preferably these bars are continued at their respective ends into the footing and to the top of the parapet wall.

The slab of concrete, which decks over the spaces between the face wall and the transverse walls and forms the top portion of the abutment and the bridge seat 10, slightly overhangs the face wall and has on its rear edge the parapet wall 9. This deck wall has a series of reinforcing bars embedded near its lower surface and extending longitudinally thereof and another series of such bars similarly embedded near the upper surface of that portion thereof, which forms the bridge seat. Thus the bridge seat is strongly reinforced and, extending as it does well back of the face wall and over the transverse walls, its load is distributed over all said walls.

Obviously, the construction hereinbefore described admits of considerable modification without departing from my invention and I do not wish to be limited to such spe-

cific construction. Thus, for instance, the construction is applicable for piers, dams, retaining walls and other similar constructions. In some cases it may be desirable to have an enclosing wall arranged transversely at the rear end of the transverse walls. So, too, the distribution of the reinforcing metal may vary according to the distribution of stresses calculated in each structure.

What I claim is:

1. An abutment consisting of a footing, a face wall and transverse strengthening walls on said footing, a slab of concrete resting on said face wall and extending back of the same onto and over said transverse walls, a parapet wall on said slab, the remaining portion of said slab forming a bridge seat extending onto the transverse walls well beyond the face wall, metal re-inforcing bars embedded in said slab and extending longitudinally thereof over the spaces between said transverse walls, and other such bars extending longitudinally thereof under the whole extent of the bridge seat.

2. An abutment of metal re-inforced concrete consisting of a footing, a face wall thereon, walls arranged on said footing transversely to said face wall and a deck wall upon the face wall extending rearwardly thereof over the transverse walls and having a parapet wall on its rear edge, the portion of the deck wall in front of the parapet wall constituting a bridge seat.

3. An abutment of metal-reinforced concrete comprising a footing, a face wall thereon, walls arranged on said footing transversely to said face wall and a deck wall overhanging the face wall and extending rearwardly thereof over the transverse walls and having a parapet wall on its rear edge, the portion of the deck wall in front of the parapet wall constituting a bridge seat.

4. A concrete abutment comprising a footing, a face wall thereon, walls arranged on said footing transversely to said face wall, a deck wall extending over the upper ends of said face and transverse walls, a parapet wall extending upwardly at the rear edge of the deck wall, reinforcing, embedded bars extending longitudinally of the deck wall and vertically inclined reinforcing bars embedded in the rear edges of the transverse walls and extending up through the parapet wall.

5. An abutment consisting of a footing, a face wall thereon, walls arranged on said footing transversely to said face wall, a deck wall on the top of and integral with said face wall and having a portion thereof formed into a bridge seat, which extends beyond the face wall well out onto said transverse face walls for the purpose set forth, and a parapet wall along the rear edge of the deck wall.

6. An abutment consisting of a footing, a face wall and transverse strengthening walls on said footing, a slab of concrete resting on said face wall and having a portion thereof formed into a bridge seat which extends back of the face wall out onto said transverse wall for the purpose specified, and a parapet wall along the rear edge of the bridge seat, said concrete slab being formed integral with its supporting walls and having metal re-inforcing bars embedded longitudinally therein above the spaces between said transverse walls.

St. Louis, Mo., July 2, 1904.

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Witnesses
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