No. 770,983. PATENTED SEPT. 27, 1904.

C. REDLICH.

CONCRETE AND IRON STRUCTURE.

APPLICATION FILED APR. 6, 1903.

NO MODEL.

Fig. 1.

Fig. 2.

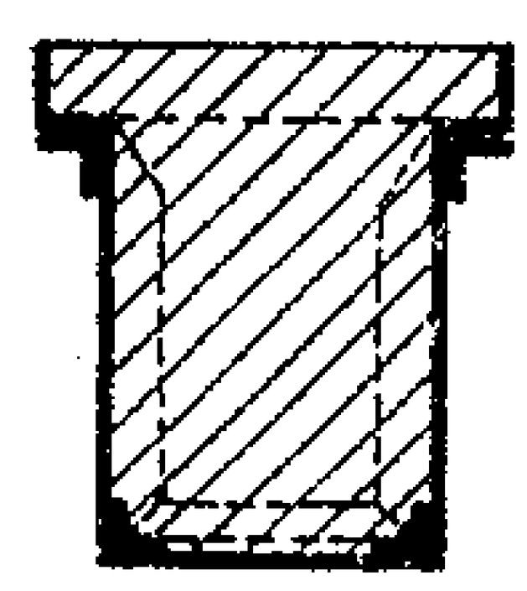


Fig. 3.

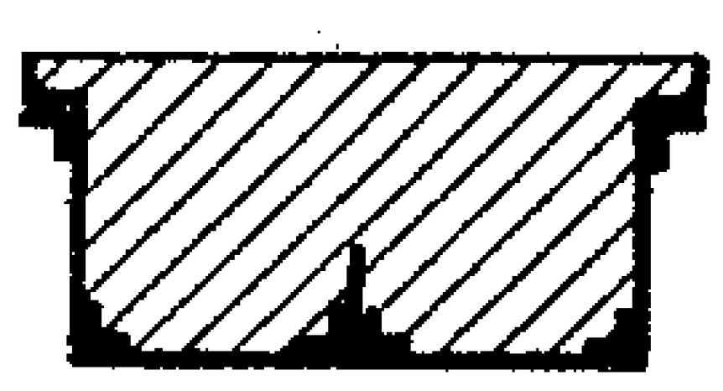


Fig. 4.

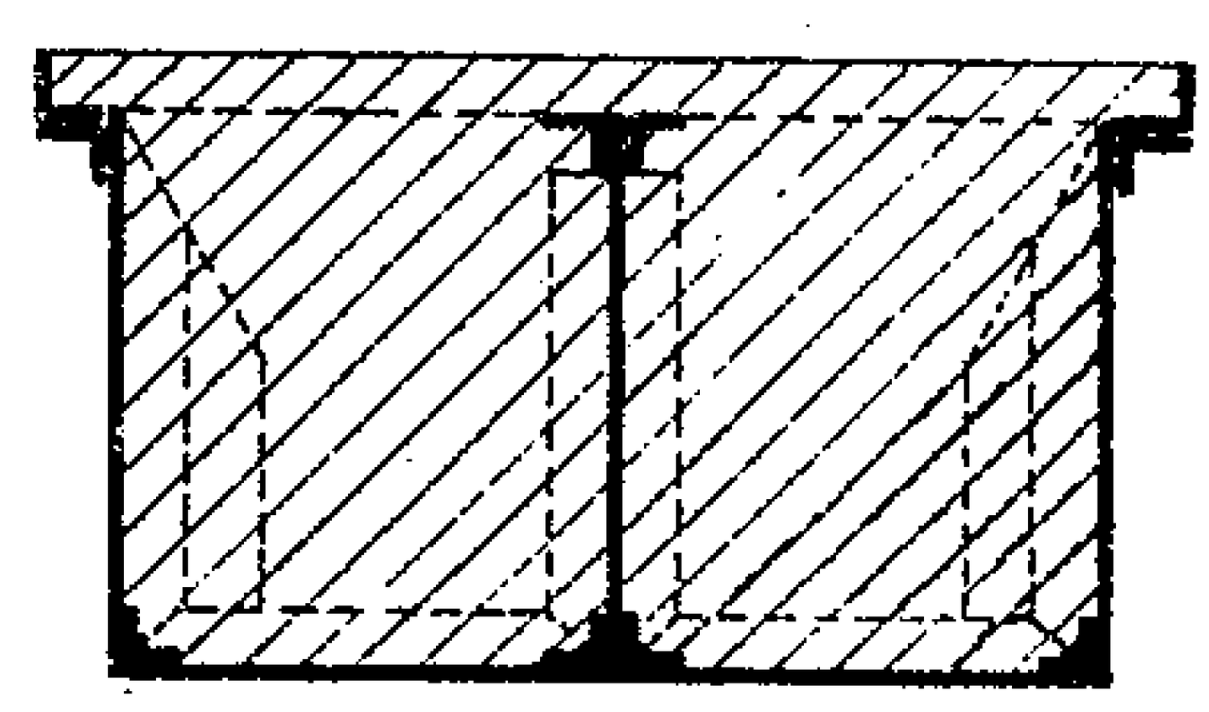
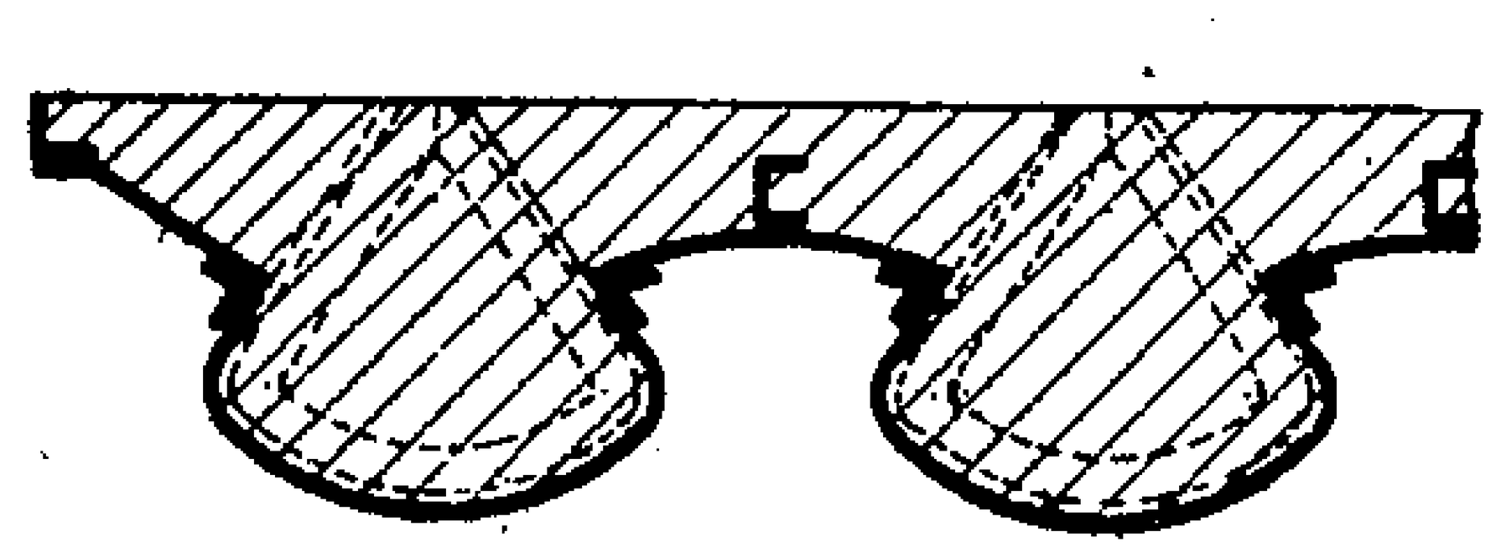


Fig. 5.



Witnesses.

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No. 770,983. Patented September 27, 1904.

UNITED STATES PATENT OFFICE.

CARL REDLICH, OF VIENNA, AUSTRIA-HUNGARY.

CONCRETE-AND-IRON STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 770,983, dated September 27, 1904.

Application filed April 6, 1903. Serial No. 151,307. (No model.)

To all whom it may concern:

Be it known that I, CARL REDLICH, a citizen of the Empire of Austria-Hungary, residing at Vienna, Austria-Hungary, have invented certain new and useful Improvements in Concrete-and-Iron Structures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In constructions of concrete and iron—such as bridges, vaults, ceilings, and the like—the concrete heretofore has always formed the enveloping part, in which the iron was inclosed for the purpose of increasing the relative strength of the structure or to receive the strain.

The object of my invention is a structure in which this disposition is reversed—that is to say, in which the iron forms the casing and concrete the inclosure or core. For this purpose I employ trough or gutter shaped iron, in which the concrete is bedded, whereby the iron is rendered extremely strong and rigid.

In the annexed drawings I have, by way of example, shown some forms of carrying my invention into practice.

Figure 1 is a longitudinal section of a bridge structure constructed in the most simple form according to my invention. Figs. 2 to 5 show cross-sections of different forms which may be employed for similar constructions.

As already mentioned, the novel feature of my improved structure consists in employing gutter-shaped iron girders of any desired or suitable cross-section, but open on top and closed at the other sides. According to the strain to which the structure is to be subjected and mainly to prevent a bellying or bulging out of the sides, these may be stiffened by suitable ribs. These troughs are by preference made of plate iron in connection with T or angle iron. After these troughs are finished they are first put into place and are then filled with the concrete. The concrete is finally covered by the material adapted for the particular construction—in a bridge, for instance, by the road-bed, in ceilings by the flooring, in vaults by earth, and such like.

The forms of the troughs or gutters which serve for the reception of the concrete depends upon the desired form of girder, and the cross-sections of the same naturally increase from the supports to the spring, and vice versa.

In Figs. 2 to 5 of the drawings different cross-sections are shown. Fig. 2 is a simple girder. Fig. 3 is a similar one, but provided with a central stiffening-rib at the bottom. Fig. 4 is a double beam formed by the combination of two troughs. Fig. 5 shows the combination of several girders for forming a roadway and sidewalks.

The principal advantages offered by this improved structure are that no erecting or center scaffolding is required, the iron gutters serving instead and possessing strength enough to support the concrete until its setting. As the concrete is perfectly protected upon its surface and not subjected to the destructive atmospheric influence, its becoming cracked on the side where it is subjected to the strain, which occurs almost without exception in the ordinary constructions, will be completely avoided. Another advantage is that the mixing of the concrete for my improved construction does not require to be done with such particular care as heretofore, because no such strength is required of the concrete in my constructions as in the ordinary ones. Instead of concrete of course any kind of mortar may be employed.

What I claim, and desire to secure by Letters Patent, is—

1. An improved concrete-and-iron structure for bridges, vaults, &c., comprising a metallic trough closed upon its sides, ends and bottom, angle-iron braces at the corners, and a filling of concrete within said trough and confined entirely within the same.

2. An improved concrete-and-iron structure for bridges, vaults, &c., comprising a metallic trough closed upon its sides, ends and bottom, angle-iron braces at the corners, a filling of concrete within said trough and confined entirely within the same, and a strengthening-rib within the trough embedded in said concrete.

3. An improved concrete-and-iron structure for bridges, vaults and the like consisting of a

metallic trough of plate-iron with angle-iron strengthening means disposed alternately within and without said trough, and a filling of concrete within said trough.

4. An improved concrete-and-iron structure for bridges, vaults and the like consisting of a metallic trough of plate-iron with angle-iron strengthening means disposed alternately within and without said trough, a filling of concrete within said trough, and a metallic stiffening-rib within the trough braced by angle-irons and embedded within said concrete.

In testimony whereof I affix my signature.

CARL REDLICH.

In presence of—
ALVESTO S. HOGUE,
O. SWOBODA.