No. 812,223. PATENTED FEB. 13, 1906.

G. L. MOUCHEL.

CONCRETE PILE, PILLAR, &c.

APPLICATION FILED APR. 3, 1905.

Fig. 1.

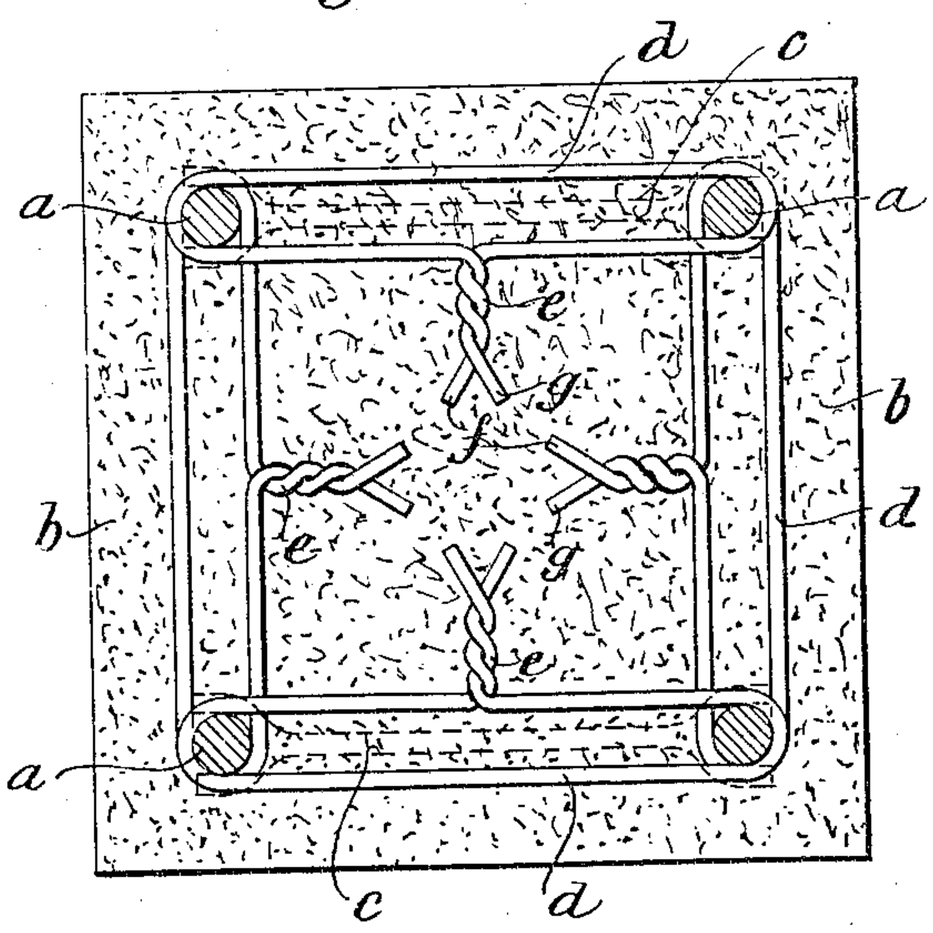
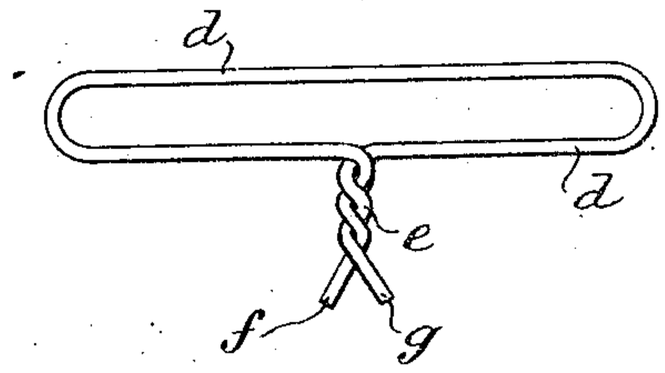


Fig. 2.



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CONCRETE PILE, PILLAR, &c.

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Application filed April 3, 1905. Serial No. 253,669.

To all whom it may concern:

Be it known that I, GUSTAVE LOUIS MOUCHEL, engineer, a citizen of the Republic of France, residing in London, England, have invented certain new and useful Improvements in and Relating to Concrete Piles, Pillars, Beams, and other Concrete Structures, of which the following is a specification.

This invention relates to concrete piles, pillars, beams, and other concrete structures where lengths of rolled metal of any section are embedded in the concrete and held in position by struts and ties or links, and has for its object to provide a simple and efficient means of tying the lengths together and bonding the ties or links to the concrete.

A concrete structure made in accordance with this invention comprises lengths of rolled metal embedded in concrete, struts between lengths of rolled metal, and links formed of wire twisted upon itself at the side thereof and projecting ends to said links.

Referring now to the drawings, Figure 1 is a section of one form of pile, beam, or pillar made in accordance with this invention and showing the links in position; and Fig. 2 is a plan of one form of link made in accordance with this invention.

a represents the lengths of rolled metal disposed in concrete *b* and held in position by struts *c* and links *d*. The links *d* are formed of wire twisted on itself, as at *e*, preferably leaving projecting ends *f* and *g*.

In the construction of piles, beams, or pillars the lengths of metal *a* are placed in position and the links *d* are slipped over the lengths of metal *a*, so that the twist *e* and the ends *f* and *g* project toward the center of the structure and the lengths of metal are strutted in any well-known manner, such as by struts *c*, and the concrete *b* is then molded round the lengths of metal *a*, the twist *e* and the ends *f* and *g* of the link serving to anchor the link and lengths of metal to the concrete.

The links are very simple in form and can be twisted up to a uniform or desired gage at a very small expense.

From the experiments which I have made I find that piles, beams, or pillars made with this form of link have very great advantages both over piles provided with plates drilled with holes to receive the lengths of metal and over those provided with a simple coil of wire of which the ends are not twisted, but lie more or less in the coil or over those provided with a link the ends of which are welded together. The objections to the plates are the cost of construction, the difficulty of placing them in position, and, by reason of their forming a layer of metal in the structure which becomes a cleavage-line, a further objection is that the plates are apt to project beyond the lengths of metal and come too near the surface of the pile, frequently resulting in their exposure and rust and the admission of moisture to the heart of the pile and the ultimate destruction of the plates and lengths of metal. The objection to the old form of wire loop is that it tends to uncoil under great pressure.

A link such as above described cannot possibly spring, but must snap before it can give way under the buckling of the main bars.

The great advantage of the use of this form of link has been proven by experiments, in which a pillar made with the new link stood a pressure about thirty per cent. greater than the breaking pressure of pillars made with coils of wire in which the ends are not twisted upon one another.

The links embedded in the core of the pile or structure not only prevent the lengths of metal from buckling, but add materially to its power to resist compression strains, and, moreover, they oppose great resistance to the lateral expansion of the core of the pile or structure, and this construction is therefore a considerable advantage so far as the stability of the structure is concerned.

The construction herein described has considerable advantages over the welded link shown in my Patent No. 673,043, of May 7, 1901. The rods clamped by the welded link cannot be separated unless the link fails at the joint or in itself. The strength of the material of which the link is made can be ascertained; but the uncertain factor and the weakest part is the joint. A welded joint depends on the skill of the workman and under tests does not give uniform results. Moreover, welded links cannot be easily slipped in position, and it is practically impossible to weld them in position. Further, a welded link lacks an important advantage possessed by the improved link. In the present links the forks of the twisted ends are held tightly in the concrete toward the heart of the pile, where the concrete has most available power and where it is subjected to the least strains. Further, by anchoring the links in this man-

ner the tendency of the rods to move outward and fracture the concrete is reduced to a minimum.

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

1. A concrete structure comprising lengths of metal embedded in concrete, struts between said lengths of metal, and links formed of wire twisted on itself at the side thereof, and projecting ends to said links, substantially as described.

2. A concrete structure comprising lengths of metal embedded in concrete, struts between said lengths of metal and links formed of wire twisted on itself at the side thereof, projecting ends to said links, said projecting ends lying toward the center of the structure, substantially as described.

3. A reinforcing device for concrete structures having embedded rods therein, comprising an elongated link the ends of which are adapted to fit over such rods so as to tie them together, and said link being formed of wire the ends of which are brought together at one side of the link and are twisted around each other and extend in a direction away from the link to form a projecting part of the link.

4. A reinforcing device for concrete structures having embedded rods therein, comprising an elongated link the ends of which are adapted to fit over such rods so as to tie them together, and said link being formed of wire the ends of which are brought together at one side of the link and are twisted around each other and extend in a direction away from the link to form a projecting part of the link, the projecting part being in the plane of the link.

5. A concrete pile comprising lengths of metal embedded in concrete, struts between said lengths of metal, and links formed of wire twisted on itself at the side thereof, projecting ends to said links, said projecting ends lying toward the center of the pile, substantially as described.

6. A concrete beam comprising lengths of metal embedded in concrete, struts between said lengths of metal and links formed of wire twisted on itself at the side thereof, projecting ends to said links, said projecting ends lying toward the center of the beam, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GUSTAVE LOUIS MOUCHEL.

Witnesses:
H. D. JAMESON,
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