SUPPORT FOR CONCRETE.

UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, JOHN P. HALLAHAN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Support for Concrete, of which the following is a specification.

In the fire proofing of buildings and particularly in the protection of metal work upon smooth surfaces thereof, difficulty is experienced in retaining the protecting medium against the cracking effect of heat. It is customary to provide layers of concrete or other fire resistant beneath beams etc, to prevent flame on attacking the parts directly and there must be full protection against attack from beneath because of the general upward movement of the fire and resultant heat. The support of the fire resisting medium has proved a difficult matter. Unless this portion upon the beams etc, be of excessive width its connection with the concrete or other fire resisting medium above is of but small cross section forming a neck or necks at the edges of the beam which break readily under exposure to flame, dropping the entire concrete facing of the beam.

The purpose of my invention is primarily to provide for the proper support of this concrete facing for beams, structural shapes and other building members of which the beam is here merely taken as a type and to protect against the fall of the facing, in case of cracking of the portion by which the material is connected with that upon the upper side of the beam. This is of course but a single instance of utility of my invention.

While my invention finds its greatest usefulness in the support of the concrete or other facing beneath the beam, it manifestly is advantageous also in support of other depending constructions such as ceilings, etc., and facings for all relatively smooth surfaces and in general protection of structural metal against fire.

Figure 1 represents in perspective, one form of my new concrete support showing certain wires thereof in dotted line. Fig. 2 represents in vertical section, an I-beam supplied with the same form of my invention with concrete in place. Fig. 3 represents in perspective, and in partial section, a portion of an I-beam with my support attached thereto, retaining reticulated metal for ceiling use. Fig. 4 represents in cross section, a composite beam supplied with a plurality of my supports.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, in constructions where it is desired to protect beams and other building members which I have typified in Figs. 1 and 2 by an I-beam, there has been difficulty in retaining a sufficient amount of concrete or other protective material around the bottom of the beam or as a facing or protection where used. The physical strength of the concrete is sufficient to retain it under normal conditions but under the influence of heat the material relied upon for protection is cracked away from the metal to be protected. By my invention I present a longitudinal support in such close proximity as may be desired to the beam, girder or other member to be protected with the result that my transverse supports and longitudinal wires themselves perform the duty of retaining the facing or other protection in case the ordinary means of retention fail or be omitted.

While I have illustrated my invention as applied to I-beams and composite girders, it will be evident that it is applicable to all types of beams, girders and other structural metal and that it is applicable to vertical and inclined as well as horizontal protection where there is likelihood of fire protective material cracking away and where it does not have direct and immediate support.

1 designates a beam which may be of any suitable form. I have shown it in Figs. 2 and 3 as an I-beam and particularly referred to the application of the concrete to the soffit thereof.

2 designates a support for the concrete herein consists of a bar or clip having a hooked end 5 and the other end preferably initially straight. This clip 4 is most desirably formed of wire or of a strip which may be readily bent at the straight end to engage with the opposite side of a flange or soffit, such as 2, to that with which the hooked end engaged.

The second member which I term a hook herein consists of a depending double hook arranged to be supported by the bar 4 and to support wires or strips, substantially parallel to the beam in its double hook members. Its eyes 6 surround the rod 4 which is pref-
erably passed through them before the bar 4 is secured in place. The eyes are connected by downwardly and inwardly turned portions 7 joined by the portion 8. I prefer having these downwardly turned portions and the body portion 8 of such shape that they cooperate with the extensions 9 by which the hooks 10 are connected with the eyes 6 in such a way as to prevent disengagement of the bar 4 from the eyes 6 in any other than a longitudinal direction. While it is, as indicated, not necessary that these eyes be thus closed sufficiently to prevent sidewise withdrawal of the bar or clip, in which case these so-called eyes might perhaps more accurately be called hooks, the eye form is preferred. For convenience, and to distinguish from the terminal hooks, I therefore uniformly call these intermediate parts engaging with the bar or clip "eyes" in the claims, intending thus to designate them whether they be closed or not. The hooks 10 are completed by terminals 11 which I have illustrated as provided with humps but which may evidently be of any desired shape. The chief advantage in having the hump is to complete the clip against accidental disengagement of the wires 12 during the placing of the concrete or other facing. In the present instance the parts 6, 7, 8, 9, 10 and 11 of which all are double except 8 are made from a single piece of wire but they may evidently be otherwise formed and may be made from any suitable strip of whatever cross section. The hooks evidently need not be turned outwardly, as shown with respect to parts 9. The wires 12 are arranged longitudinally of the member to be protected and are readily insertible into the open ends of the hooks past the humps when these are used, so as to be seated in the position shown in the figures. When the wire and longitudinal wires, rods or strips 12 have been put in place, the structure is surrounded by a suitable form and the concrete or other protecting medium is set in place, after which the form is removed, as in the present practice.

The clip 4 can be made of a single standard length for a large number of sizes of I-beams, inasmuch as the soffit 2 of the I-beam varies but slightly in width with large differences in the height of the I-beam. There is corresponding difference in the amount of the end 13 turned but this does not affect the ultimate construction as completed.

In Fig. 3 I have illustrated how my support may be used also as a ceiling support showing reticulated metal 14, of which the ceiling is partly composed, supported upon the rods or wires 12. This does not prevent use of my invention to carry out its main purpose of fire protection for structural iron and steel as the beam soffit can be protected by concrete reinforced by my support and longitudinal rods with some advantage notwithstanding the reticulated metal though without as great advantage as in its absence. This figure merely shows one use of which my invention is capable but not the most desirable thereof.

In Fig. 4 I have shown my construction as applied to a composite beam having flanges 15 of much greater width than ordinarily occurs with the I-beam. I provide the same type of clip 4 of proper length therefor and support the additional width of facing by using a plurality of my hook members upon the clip 4, using whatever number and spacing thereof as may be desirable or necessary. The composite beam 16 is thus suitably protected by a facing embodying the supports at such intervals as may be desired.

My invention consists not only in the support or reinforcement of which I make use but also in its combination with the protective material and with the structural metal.

It will be apparent that various changes may be made by those skilled in this art which may come within the scope of my invention and I do not desire to be limited in every instance to the exact construction herein shown and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a support for fire proofing structural material wires longitudinally disposed with reference to the same and in proximity thereto, a clip cooperating with the face of the metal and a double hook pivotally connected at a plurality of spaced points with said clip and supporting said wires.

2. In a support for fire protecting and as an article of manufacture, an open ended clip in combination with a double depending hook having intermediate spaced eyes surrounding said first mentioned clip.

3. As an article of manufacture, a clip initially having one end straight and the other end bent, in combination with a wire support of a single piece of wire comprising terminal hooks and intermediate spaced eyes for engagement with the clip.

4. In a support for fire proofing and as an article of manufacture, a clip for engagement with the facing to be protected in combination with a double hook comprising terminal open hook members and intermediate spaced eyes of a single piece for engagement with the clip.

5. In a support for fire proofing for structural shapes, a clip for engagement with the shape whose face is to be protected, wires substantially parallel with the said face, and a hook for supporting said wires from the clip, and comprising a pair of terminal...
hooks, and eyes spaced by an intermediate bar for movable engagement with the clip.

6. The combination with flanged beams, of main supporting members comprising 5 wires having their ends bent to form open-sided eyes with projecting ends extending substantially toward each other and adapted to engage and be frictionally supported by the flanges of said beams, supplemental supporting members having open-sided eyes and hooked portions for engagement with the main supporting members, reinforcing rods or bars carried by the hooked portions of said supplemental members and disposed in the open-sided eyes of the same, and shoulders formed by contracting the throats of said eyes to provide a space less in width than the diameter of the rods whereby the latter may be retained in place and spaced from the beams.  

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Witnesses:
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