

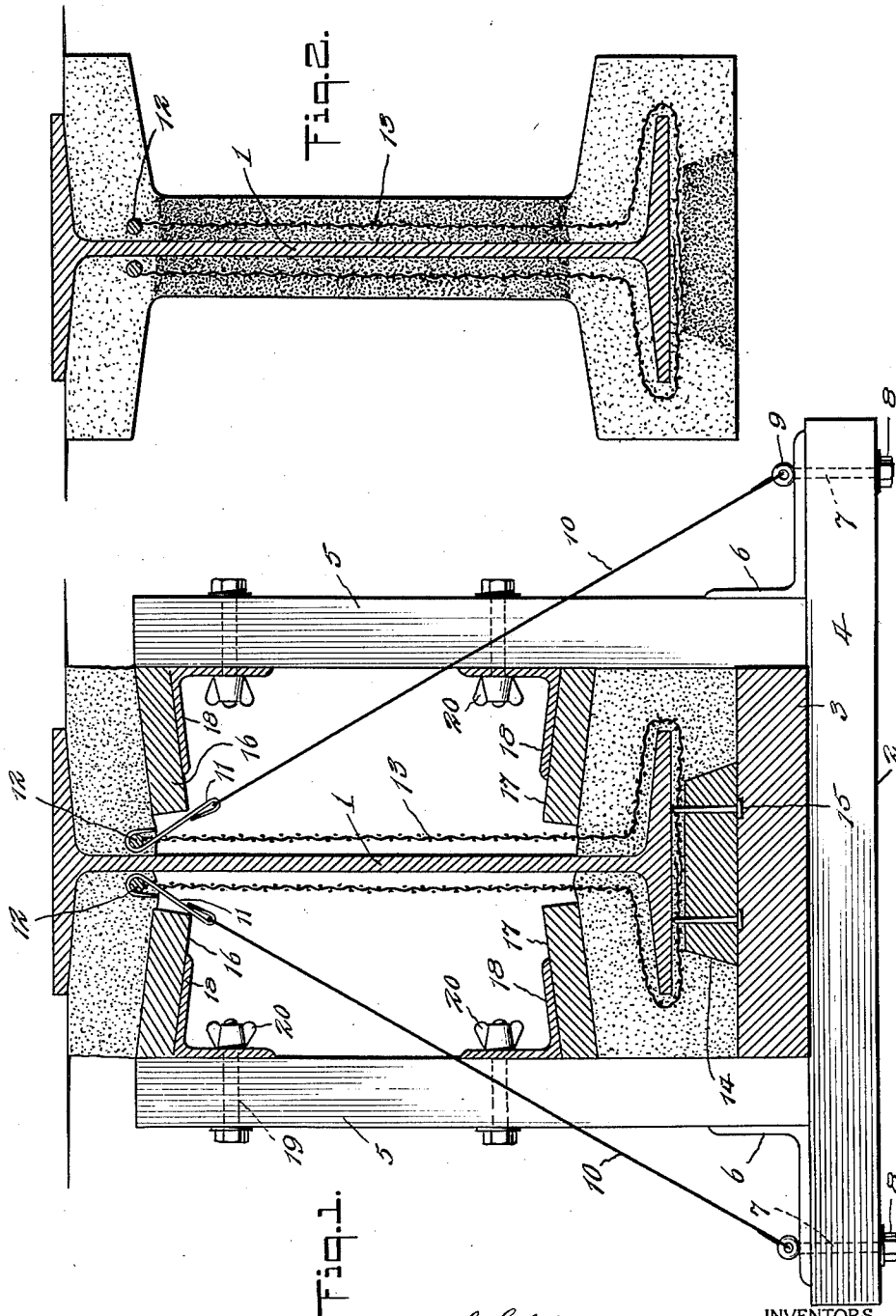
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B. C. COLLIER ET AL

METHOD OF AND MEANS FOR INCASING GIRDERS OR THE LIKE

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Bryan C. Collier & Willis L. Loebe INVENTORS

BY

Marks & Clerk ATTORNEYS

# UNITED STATES PATENT OFFICE.

BRYAN C. COLLIER AND WILLIS LERICHE, OF ALLENTOWN, PENNSYLVANIA, ASSIGNORS TO CEMENT-GUN CONTRACTING COMPANY, OF ALLENTOWN, PENNSYLVANIA, A CORPORATION OF DELAWARE.

## METHOD OF AND MEANS FOR INCASING GIRDERS OR THE LIKE.

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*To all whom it may concern:*

Be it known that BRYAN C. COLLIER and WILLIS LERICHE, citizens of United States of America, residing at Allentown, Lehigh County, Pennsylvania, have invented certain new and useful improvements in Methods of and Means for Incasing Girders or the like, of which the following is a specification.

This invention relates to a method of and means for incasing girders or the like with material such as concrete or cement mortar. More specifically the invention relates to a form or shooting strip for use in connection with the application by means of a shooting device of suitable cementitious material, such as cement mortar, to the flanged edges of I beams.

In incasing such girders with ordinary concrete or mortar or any like material in the usual way it is necessary to build heavy and expensive forms and, after the concrete has been poured and given time to set, it is necessary to take the forms apart and remove them. Furthermore it is not certain that the concrete or mortar so applied will adhere well.

Such difficulties are obviated to a great extent by use of a shooting device with a suitable mixture of ingredients preferably cement and sharp sand in a dry state. As the cement and sand mixture is blown through the nozzle of such a device water is introduced at a higher pressure than the air, thereby puncturing the stream of flowing material and as the water from the jets becomes atomized it will cover all the particles with fine spray.

When this hydrated material is impelled against the surface to be coated the first effect is to cause a very marked rejection of material which may be sand only. The cement adheres to the surface forming a film of neat cement to serve as a matrix and, when this matrix reaches a perceptible thickness, the sand finds seat and the rejected material grows markedly less. There continues to be a certain amount of rejection of this inert material, each grain of which has, however, performed the function of acting as a tamper to drive the preceding grains deeper into the matrix in which they are

seated. The result of this pounding is to produce a very dense, hard and durable mortar. If done within a few minutes after the application of the material the surface thereof may be put into better shape as for example by the use of a screed for obtaining a plane surface.

It is an object of the present invention to provide a method of applying the covering so as to obtain a superior result and with a saving in power and labor and in wear and tear on equipment.

Another object of the invention is to provide a form or shooting strip to facilitate the work and to enable said method to be carried out to the best advantage.

In carrying out the invention in one way provision is made of a continuous strip or base member of material of a width corresponding to the proposed width of the lower edge of the girder when covered. This strip is carried by cross pieces spaced at suitable intervals and provided outside the main strip with posts to which are detachably secured continuous members which serve, respectively, to form the upper surface of the lower flange incasement and the lower surface of the upper flange incasement. Secured on the upper face of the main bottom strip is a so called plug which is continuous and serves to prevent the material from being blown completely through the shooting strip beneath the lower flanged edge of the girder. The shooting strip is furred out or spaced from the bottom of the girder by means of members projecting upwardly from the plug.

The operation of applying the incasing material by means of the form or shooting strip may be substantially as follows. The form without the detachable members may be placed in position and attached to the girder by means of wires connecting the cross pieces with reinforcing material secured on the girder.

The detachable strips are then applied and secured in position and the incasing material shot in between the upper flanges of the girder and the upper strips and between the lower detachable strips and the main bottom strip. After removing the detachable strips, the remainder of the shooting strip

is detached and removed and covering material applied by means of the shooting device to the sides of the web of the girder and also at the bottom of the girder to fill the groove left by the removal of the plug.

Other features and advantages will hereinafter appear.

In the drawings:

Fig. 1 is a sectional view showing the form or shooting strip in position on the girder and the covering material applied by use of the form, and

Fig. 2 is a view similar to Fig. 1 but with the form removed and the covering complete, the material applied after removal of the form being, for convenience, shown as darker than that previously applied.

When the girders 1, one of which is shown, of a steel frame structure have been placed in position and the work has progressed to a stage at which it is desirable to incase the girders, a form or shooting strip 2 is applied to each girder as required and the covering material applied as hereinafter described.

According to the preferred embodiment of shooting strip here disclosed, provision is made of a continuous base member supported by cross members 4 spaced at suitable intervals and carrying uprights or posts 5. Preferably the member 3 consists of a plank dressed to the proper dimensions depending upon the thickness of the incasement and width of the lower flange. The cross pieces 4 are spaced preferably about four feet on centers and the posts 5 are attached thereto by means of angle irons 6. Through the outer ends of the angle irons 6 pass bolts 7 secured by nuts 8 and having at their opposite ends eyes 9 to which are attached supporting wires 10. At their other ends the wires 10 are connected by hooks 11 to members 12 used to secure reinforcing material on the girder 1.

Secured to the base member 3 at its top is a continuous member or plug 14 which serves to space the member 3 from the flanged lower edge of the girder and also to prevent the covering material from being shot completely through beneath the girder. The shooting strip is furred out or spaced the right distance from the lower flange of the girder 1 by suitable means such as nails 15 spaced close enough to prevent deformation of the members 3 and 14. In order to facilitate the attachment of the wires 10 to the members 12 by means of the hooks 11, the wires are loose when the shooting strip is applied to the girder. By tightening up the tail nuts on the eye bolts 7 the shooting strip is brought accurately into position.

After the installation of the main portion of the shooting strip, as just described, members 16 and 17 are positioned near the upper and lower flanges, respectively of the girder or I beam 1 and secured in position by angle

irons 18, bolts 19 and the wing nuts 20. Covering material is now shot horizontally into engagement with the bottom and upper flanges and is then struck off at the inner lines of the posts 5. After the material has set sufficiently to be self-supporting, members 16 and 17 are released by loosening the wing nuts 20 and hooks 11 are cut off thus permitting removal of the rest of the form in one piece. The use of hooks 11 eliminates the necessity of cutting the supporting wires 10 and consequently the replacement of the latter every time the form or shooting strip is to be used. After the removal of the form from the girder 1, the key or groove left by the plug 14 and the web of the steel member or girder 1 are enclosed, as indicated in Fig. 2, by shooting the material into place in the usual manner.

One very important advantage of using the form or shooting strip of the present invention is that it can be used regardless of head room. The present shooting strip enables the nozzleman to work with much greater ease and facility than is ordinarily the case, inasmuch as it eliminates the constrained position which he would be compelled to assume with shooting strips used heretofore. Other advantages are: (1) elimination of sand pockets; (2) better adhesion to steel; (3) saving in cement and sand due to elimination of loss from rebound; (4) production of straighter lines and reduction of area to be screeded; (5) automatic elimination of difficulty of getting square corners and edges; (6) requires less skill on the part of nozzle men and finishers; (7) requires one operation less in shooting thereby increasing speed at which work can be done and effecting saving in scaffolding; (8) saving in power, labor and wear and tear on equipment in that the amount of work is reduced by elimination of much of the rebound; and (9) ease and facility in taking down and erecting by the use of the wire hangers, eye bolts, tail nuts and hooks.

It should be understood that the embodiment of the invention herein disclosed is merely illustrative of the invention and that various changes can be made without departing from the spirit of the invention.

Having thus described our invention, we claim:

1. A device for use in incasing a girder by shooting the material into place, comprising a continuous member to be placed beneath the flanged lower edge of the girder to determine the lower surface of the flange incasement, means to support said member, and strips detachably carried by said supporting means to form the upper surfaces of the incasement for the flanges at said lower edge when material is shot in from the side around said flanges.

2. A device for use in incasing a girder

by shooting the material into place, comprising a continuous member to be placed beneath the flanged lower edge of the girder to determine the lower surface of the flange incasement, means to support said member, strips detachably carried by said supporting means to form the upper surface of the incasement for the flanges as said lower edge when material is shot in from the side around said flanges, and additional strips detachably carried by said supporting means to form the lower surfaces of the incasement for the upper flanges.

3. A device for use in incasing a girder by material shot into position, comprising a continuous member beneath the flanged lower edge of the girder to determine the lower surface of the flange incasement, means including connections between the outer edges of the continuous member to the web of the girder below the upper flanges, and detachable strips for support by said continuous strip to form, respectively, the upper faces of the lower flange incasement and the lower faces of the upper flange incasement.

4. A device for use in incasing a girder by material shot into position, comprising a continuous base member to determine the lower surface of the lower flange incasement, a continuous plug member centrally positioned on said base member to prevent the incasing material from being shot completely through beneath the girder, means for supporting said base member from the web of said girder, and detachable strips supported by said supporting means for forming the upper surfaces of lower flange incasements and the lower surface of upper flange incasements.

5. A device for use in incasing a girder with material shot into position, comprising a continuous base member to determine the lower surface of the lower flange incasement, a continuous plug member centrally positioned on the base member to prevent the incasing material from being shot completely through beneath the girder, means for spacing said plug member from the lower edge of said girder, means for supporting said base member from the web of said girder, and shiftable strips supported by said supporting means for forming the upper surfaces of lower flange incasements and the lower surfaces of upper flange incasements.

6. A device for use in incasing a girder with material shot into position, comprising a continuous base member to determine the lower surface of the lower flange incasement, cross pieces supporting said base member at intervals, posts extending upwardly from said cross pieces at the outer edges of said base member, tension members connecting the outer ends of said cross pieces to the web of said girder, means for ad-

justing the position of said cross pieces by means of said tension members, and strips for detachable connection with said posts to form the upper faces of the lower flange incasements and the lower faces of the upper flange incasements.

7. A device for use in incasing a girder with material shot into position, comprising an element to be placed over and removed from the lower edge of the girder, said element including a continuous base member to form the lower surface of the lower flange incasement and posts extending upwardly at the edges of said base member, means to secure said element to the web of said girder, strips to be placed along said posts after said element has been placed on said girder, and means to detachably secure said strips to said posts to form the upper surfaces of lower flange incasements and the lower surfaces of upper flange incasements.

8. A device for use in incasing a girder by material shot into position, comprising an element to be placed over and removed from the lower edge of the girder, said element including a continuous base member to form the lower surface of the lower flange incasement, cross pieces supporting said base member at intervals and posts extending upwardly from said cross pieces at the edges of said base member, means to secure said element to said girder comprising hooks for attachment to the web of said girder and adapted to be cut after the adjacent portion of the girder has been incased, wires attached to said hooks and adjusting devices connecting said wires and said cross pieces for adjusting the position of said element, and strips to be attached to said posts to form the upper surfaces of lower flange incasements and the lower surfaces of upper flange incasements.

9. The method of incasing a girder, including the steps of shooting material horizontally beneath overhanging flanges at the upper edge while confining the material beneath said flanges, shooting material horizontally above and below the flanges at the lower edge of the girder while confining the material above such flanges to determine the upper surfaces of the flange incasements and confining the material below such flanges to determine the lower surface of the flange incasement.

10. The method of incasing a girder, including the steps of shooting material horizontally beneath overhanging flanges at the upper edge while confining the material beneath said flanges, shooting material horizontally above and below the flanges at the lower edge of the girder while confining the material above such flanges to determine the upper surfaces of the flange incasements and confining the material below such flanges to determine the lower surface of the flange incasement.

casement, and to prevent the material from being shot completely through beneath the lower edge of the girder.

11. The method of incasing a girder, consisting in shooting material horizontally beneath the overhanging flanges at the upper edge of the girder while confining the material beneath the flange, shooting material above and below the flanges at the lower edge of the girder while confining the material above such flanges to determine the upper surface of the incasing material and confining the material below the lower edge of the girder to form the lower surface of the incasing material at the sides of the lower edge and at the middle to prevent the material from being shot completely through beneath the girder, and shooting material to cover the web of the girder.

12. The method of incasing a girder, consisting in shooting material horizontally beneath the overhanging flanges at the upper

edge of the girder while confining the material beneath the flange, shooting material above and below the flanges at the lower edge of the girder while confining the material above such flanges to determine the upper surface of the incasing material and confining the material below the lower edge of the girder to form the lower surface of the incasing material at the sides of the lower edge and at the middle to prevent the material from being shot completely through beneath the girder, shooting material to cover the web of the girder, and shooting material to fill the groove in the bottom of the lower flange incasement formed in confining the material to a greater extent at the middle of the lower edge of the girder.

In testimony whereof we affix our signatures.

BRYAN C. COLLIER.  
WILLIS LERICHE.