Feb. 19, 1924. 1,484,053

W. BAYLEY

HANGER INSERT

Filed July 3, 1916 3 Sheets-Sheet 1

Fig. 1

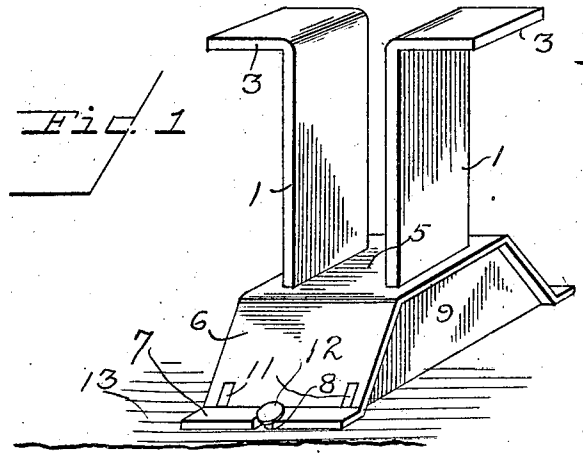
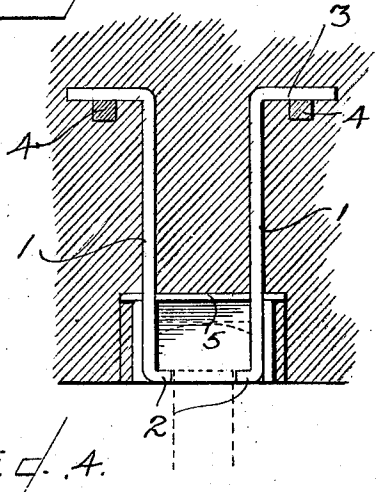


Fig. 2



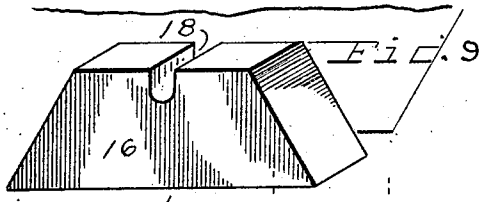


Fig. 9

Fig. 4.

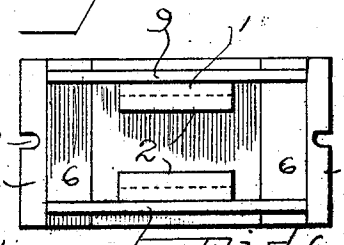


Fig. 3

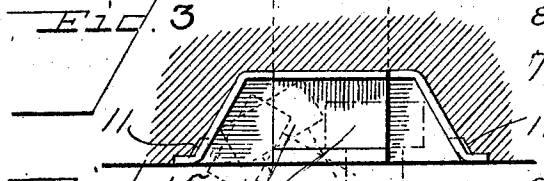
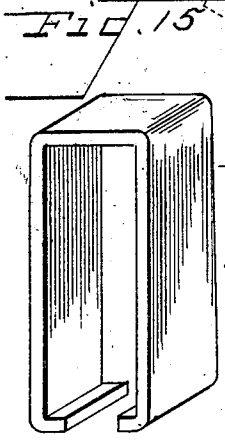


Fig. 6

Fig. 15



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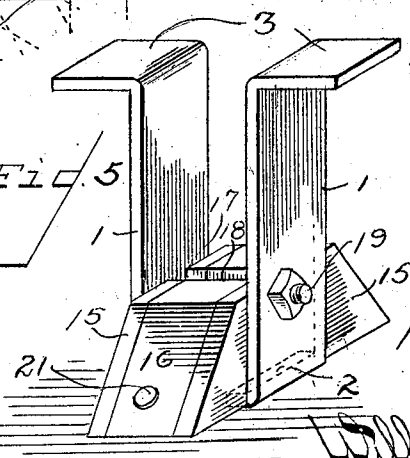
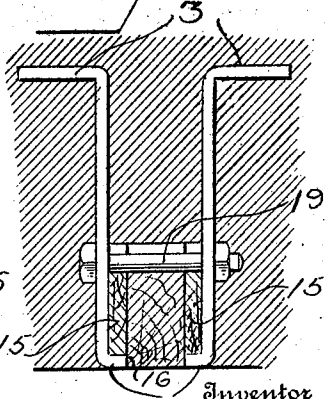


Fig. 5



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Feb. 19, 1924. 1,484,053

W. BAYLEY

HANGER INSERT

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Fig 7

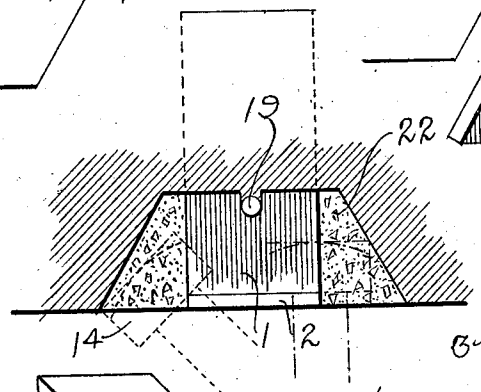


Fig 8

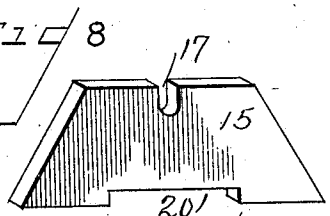


Fig 10

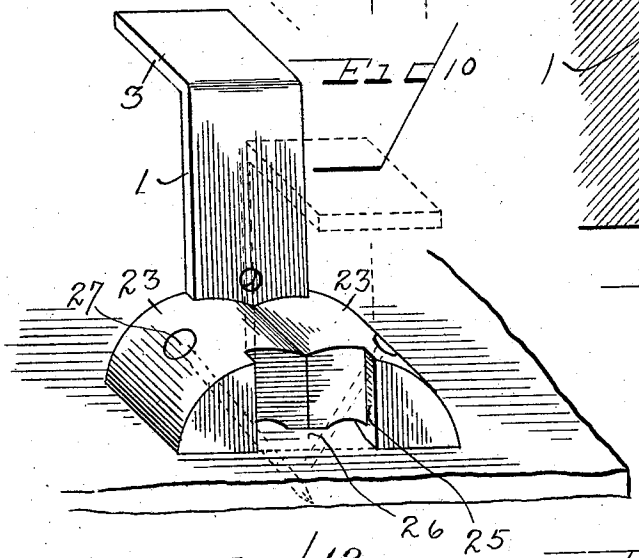


Fig 11

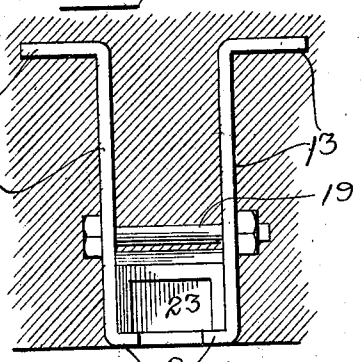


Fig 13

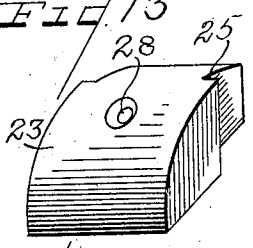


Fig 12

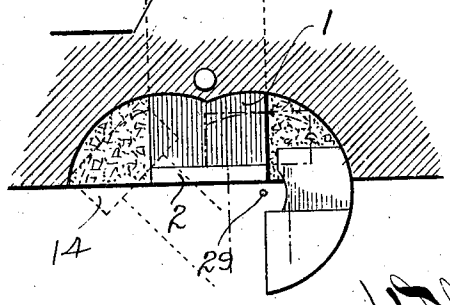
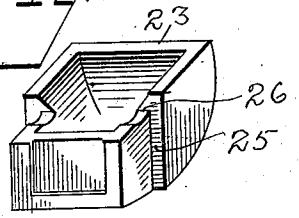


Fig 14



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Feb. 19, 1924. 1,484,053

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HANGER INSERT

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Fig. 16.

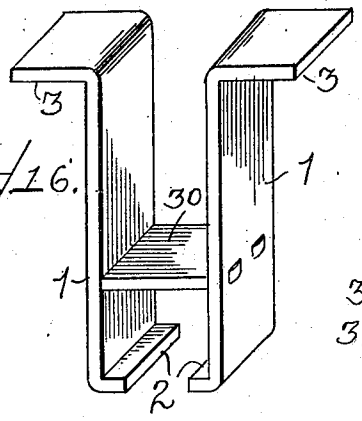


Fig. 21

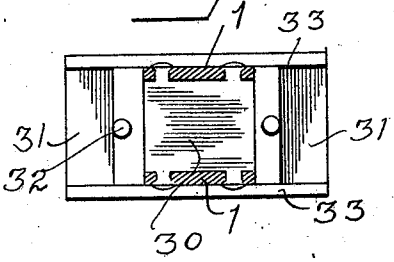


Fig. 17

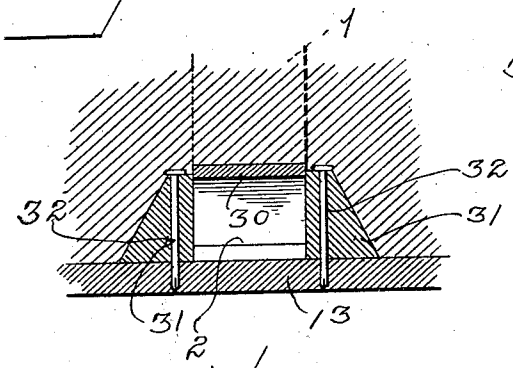


Fig. 18

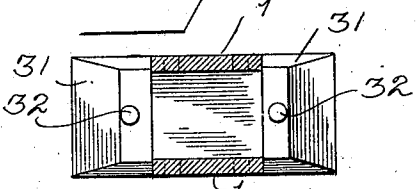


Fig. 20.

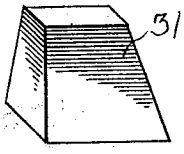


Fig. 22

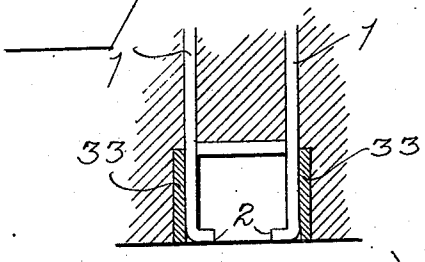
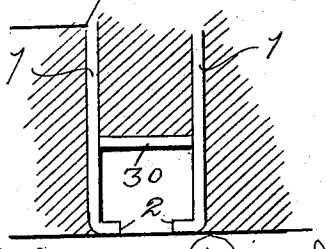


Fig. 19



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Patented Feb. 19, 1924. 1,484,053

UNITED STATES PATENT OFFICE.

WILLIAM BAYLEY, OF SPRINGFIELD, OHIO.

HANGER INSERT.

Application filed July 3, 1916. Serial No. 107,460.

To all whom it may concern:

Be it known that I, WILLIAM BAYLEY, citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Hanger Inserts, of which the following is a specification.

My invention relates to concrete structures and more particularly to ceiling and wall fixtures or hangers to be embedded in the concrete to form attachment means for line shaft hangers, machinery or other structures or parts which it is desired to detachably support upon the ceiling or wall.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction, but will be more efficient in use, convenient for location in the form or mold, capable of being easily and accurately positioned, and unlikely to get out of order.

I am aware that heretofore devices of this character have been made of cast iron. However, such devices do not possess the requisite strength and if broken or damaged they become useless as it is impossible to replace such devices successfully and securely after the concrete has set. One of the primary objects of the present invention is to provide a fixture or hanger in which the supporting members may be formed of wrought iron or steel thereby enabling them to withstand greater strain without damage or breakage.

A further object of the invention is to reduce the weight and thereby the cost of manufacture of such devices by providing removable cores or forms by which the recess or cavity for the reception of the bolt head is formed directly in the concrete material instead of in a cast iron head as heretofore employed.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Fig. 1 is a perspective view of the assembled fixture or hanger positioned in the form or mold preparatory to pouring the concrete material about it. Fig. 2 is a transverse sectional view of the hanger or fixture embedded in the concrete material. Fig. 3 is a longitudinal sectional view thereof. Fig. 4 is a bottom plan view of the fixture. Fig. 5 is a perspective view of a different embodiment of the invention positioned in the form or mold preparatory to pouring the concrete material thereabout. Fig. 6 is a transverse sectional view of the embodiment shown in Fig. 5. Fig. 7 is a longitudinal sectional view thereof. Figs. 8 and 9 are detail perspective views of the core or form members for producing the recess or cavity in the concrete material for the reception of the bolt head. Fig. 10 is a further different embodiment of the invention illustrating the use of a removable sectional core or recess form of different type. Fig. 11 is a transverse sectional view of the embodiment illustrated in Fig. 10. Fig. 12 is a longitudinal sectional view thereof with one core section partially removed. Figs. 13 and 14 are detail perspective views of the core or form member employed in the embodiment shown in Figs. 10, 11 and 12. Figs. 15 to 22 illustrate further modifications.

Like parts are indicated by similar characters of reference throughout the several views.

The present invention is capable of embodiment in numerous different forms or workable by various methods of procedure, a few of which have been illustrated in the drawings and will be hereafter described. It will be obvious that with the disclosure herein made, mechanics skilled in the art may develop other modes of procedure or other forms of fixtures or hangers and cores or molds incident thereto embodying the principles herein disclosed and dependent on the present invention.

In a general way the invention comprises flanged supporting straps arranged in pairs and oppositely disposed which are to be embedded in the concrete material together with a core or form which will not only support the straps or hangers in spaced predetermined position within the concrete form or mold prior to and during the pour-

ing operation, but will also serve to produce within the concrete body a cavity or recess for the reception of a bolt head into which cavity the flanged ends of the supporting straps project.

Referring to the structure disclosed in Figs. 1 to 4, inclusive, 1—1 are the supporting straps the opposite ends of which are turned in opposite directions as at 2 and 3. The flanged end 2 is of an extent substantially equal to the overhang or shoulder of the head of the attachment bolt to be employed in conjunction with the hanger or fixture. The opposite ends 3 which are to be embedded in the concrete material are extended a greater or less distance as may be desired and in accordance with the condition of use and the strain to which they are to be subjected. These extended or flanged ends 3—3 are to be embedded in the concrete material to secure the hanger and prevent its withdrawal when subjected to heavy strain. To afford greater security the extended ends 3 may, if so desired, be made to overhang or engage upon reinforcing bars or rods 4—4 of the concrete structure. However, for ordinary conditions of use this arrangement may not be necessary. The hanger straps 1—1 are arranged in pairs oppositely disposed with the flanged ends 2—2 extending inward or each toward the other and in a common plane.

In the present embodiment the hanger straps 1—1 are held in their spaced relation by means of the metallic core box or housing formed from sheet metal and having a top 5 provided with spaced slots or openings through which the hanger straps 1—1 extend. This slotted top 5 is extended downwardly and outwardly in diagonal direction as at 6 to form inclined end walls for the housing and terminates in base flanges 7—7 each provided with a notch 8. The sides of the core box or housing comprise side plates 9 having tongues or tenons which extend through openings in the beveled end walls of the housing and are riveted or upset as at 11.

The hanger or fixture comprising the hanger strap and the core box or housing thus assembled is secured to the interior face of the concrete form or mold by means of nails 12 driven into the form or mold 13 through the notches 8 of the flanges 7. This serves to stationarily support the fixture preparatory to and during the pouring of the concrete. After the concrete has become set the form boards 13 are torn away, leaving the hanger straps 1—1 and the housing or core box securely embedded in the structure as shown in Fig. 2.

The lower or protruding ends of the straps 1—1 project within the housing and rest against the side walls 9 thereof. The said side walls 9 form extended bearings or abutments to prevent the spreading of the hanger straps in the event that the concrete does not perfectly set or in the event that air pockets are formed adjacent to the side walls 9 of the core box or housing.

Referring to Figs. 3 and 4, it will be noted that the core box or housing is somewhat longer than the width of the hanger straps 1—1. There is thus provided at each side of the hanger straps an orifice or inlet space of sufficient width to admit the head of the attachment bolt 14. The attachment bolt 14, however, can only be introduced by tipping the bolt to an inclined position as shown by dotted lines in Fig. 3 and gradually turning the bolt to an upright or vertical position as it passes above the flanges 2—2 of the hanger straps 1—1. After the head of the bolt has been inserted within the recess or cavity it rests upon and is supported by the inturned flanges 2—2 of the hanger straps 1.

While the bolt is capable of adjustment in either direction within the limits of the core box or housing so long as it is maintained in an upright position it cannot escape therefrom either accidentally or otherwise. In Fig. 3 the position of the bolt at one limit of its adjustment is shown by dot and dash lines. It will be noted that in this position the bolt head is in contact with the inclined terminal wall 6 of the housing which limits its lateral movement while at the same time a sufficient proportion of the bolt head overhangs the inturned flanges 2 to afford secure engagement therewith. The bolt can be readily removed by tipping it to inclined position and reversing the operation of inserting the bolt head as indicated by dotted lines in said figure. It will be obvious, however, that this can only be done by detaching line shaft hangers, machinery, or other supported parts. Therefore the bolt cannot become accidentally detached while in use.

While in the construction shown the bolt head may be introduced at either end of the core box or housing, or in other words, from either side of the hanger strap, it is obvious that one end of the core box or housing may be made perpendicular to the top 5 instead of inclined, thereby closing one of the inlet orifices and necessitating the insertion and removal of the bolt head through a single orifice only.

While the construction shown in Figs. 1 to 4 has in practice been found very practical and satisfactory, a less expensive but equally as efficient construction is shown in Figs. 5 to 9 inclusive. In this embodiment the straps 1—1 are flanged and proportioned as before described. However, in lieu of the sheet metal core box of housing there is employed in the present instance a

sectional core, preferably of wood, but which may be of metal, comprising a medial member 16 and two lateral sections 15. These sections 15 and 16 are beveled at their opposite ends and are provided on their upper edges with notches 17 and 18, respectively, through which extends a transverse bolt 19 connecting the hanger straps 1—1 each with the other. This bolt 19 serves the double purpose of maintaining the core sections 15 and 16 and the hangers 1—1 in assembled relation preparatory to the pouring of the concrete, and after the removal of the core sections the bolt serves as a tie between the hanger straps assisting in resisting the side strain or any tendency to spread. In addition to the notch 18 in the upper edge of the lateral core section such sections are provided on their lower edges with notches or recesses 20 as shown in Fig. 8 to receive the inturned flanges 2 of the hanger straps.

In assembling the hanger or fixture in this embodiment the core sections 15 and 16 are arranged side by side with the section 16 between the sections 15 and the hangers 1—1 are located at opposite sides of the core sections 15 with the flanges 2 projecting within the recesses 20 of the sections 15. The tie bolt 19 is then passed through suitable openings in the hanger straps and through the notches or recesses 17 and 18 in the core section, and the nut is tightened to clamp the core sections between the hanger straps. The assembled fixture or hanger and core is then secured to the interior of the concrete mold or form by means of nails 21 driven through the beveled edge of the core sections into the form or mold. The hanger and core are thus supported in adjusted position preparatory to and during the pouring of the concrete.

After the concrete has set the form is torn away, thus exposing the core sections 15 and 16. It will be noted that the section 16 is of such width that it readily passes between the inturned ends of the flanges 2—2. After removing the form 13 the medial section 16 of the core is withdrawn, permitting access to the lateral section 15 which may be shifted laterally within the cavity or recess formed by such core and then withdrawn between the inturned flanges 2—2.

The sectional core comprising the sections 15 and 16 forms directly in the concrete a cavity or recess as indicated at 22, Fig. 7, into which the lower or inturned flanged ends of the hanger straps project.

The operation of inserting and removing the head of the attachment bolt is the same as that before described. The bolt is tilted to a position as indicated by dotted lines in Fig. 7 to enable it to be inserted or removed. The lateral adjustment of the bolt while within the recess or cavity is limited by its engagement with the end walls of the recess in which position it still maintains sufficient engagement with the flanges 2—2 to enable it to support the required weight.

It is obvious that the tie bolt 19 may be located above the level of the core sections 15 and 16, in which case the notches 17 and 18 may be omitted from such core.

While in the embodiment shown in Figs. 5 to 9 the removable core is divided longitudinally, in that embodiment shown in Figs. 10 to 14 the core is divided transversely. In this construction the straps 1—1 are formed and proportioned as before described. The removable core, which forms directly in the concrete the cavity or recess to receive the heads of the attachment bolt, comprises two arcuate core members 23, preferably of metal, which rest upon the form boards 13 of the concrete structure.

The core members 23 are offset or shouldered on opposite sides as at 25 and on their under or base sides as at 26. The offsets or shoulders formed in the core members 23 are of such dimensions that when the core members are arranged face to face in contact one with the other, as shown in Fig. 10, the combined recesses or offsets will coincide with the width of the hanger straps 1—1.

The core members 23 are secured to the form boards 13 by means of nails 27 extending through beveled or counter bored openings 28 in the convex faces of the core members. The core members being secured in pairs face to face and in contact one with the other to the interior faces of the concrete form, the hanger strap 1—1 are engaged therewith by inserting the inturned flanges 2 thereof beneath the offset or overhanging portions 26 of the core members with the vertical or upright portions of the straps 1—1 within the recess formed by the offsets or shoulders 25 of said core members as clearly indicated in Fig. 10. The hanger straps thus engaged will retain their adjusted position.

If so desired, a tie bolt 19 may be provided to insure the proper relation of the hanger straps during the pouring operation and to assist the straps to resist side strain or spreading tendency thereafter. Under ordinary conditions of use, however, if the concrete material is of proper density and no air pockets are formed adjacent to the hanger straps, the tie bolt will be unnecessary.

The hanger straps and core members are retained in position during the pouring operation by means of the nails 27. After the concrete has set or hardened the form boards 13 are torn away, thus releasing the core members 23 which may be then rotated about the center or axis 29 with which

the convex faces of the core sections are concentric. The rotation or oscillation of the core sections enables their withdrawal from the cavity or recess formed directly in the concrete thereby. In order that the core members 23 may clear the corner of the flange 2 in their withdrawal movement the base shoulder 26 is slightly concaved as at 24.

The inturned or flanged ends of the strap hangers project into such cavity or recess and the heads of the attachment bolt is inserted and removed in the manner before described. The cavity or recess thus formed is of such dimensions as to permit the attachment bolt a limited adjustment in either direction but serves to limit this adjustment and prevent the accidental disengagement of the bolt through the contact of the bolt head with the end walls of the cavity as before described.

In the embodiment shown in Figs. 1 to 4 the sheet metal core box or housing becomes permanently located within the concrete structure while in those embodiments shown in Figs. 5 to 14 the core members are only temporaraily positioned and are removed from the concrete body subsequent to the removal of the form 13, leaving the cavity or recess formed directly in the concrete material. The removable core sections may be used repeatedly.

In Fig. 15 there is shown a modification of the construction in which the arms 1—1 are connected together instead of turning their upward ends outward as at 3. This construction is employed exactly as before described.

It is obvious that other forms of tie device than the bolt 19 may be employed. Such tie may comprise a wire, or a loop through which the arms 1 extend or it may be a head as shown in Fig. 16. In this construction the head 30 serves to exclude the concrete from the space between the arms 1—1 while independent sectional form blocks 31 secured to the form boards 13 by means of nails 32 serve to form the beveled depression or recess. The form blocks 31 support the hanger between them but being independent thereof easily withdraw from the recess with the removal of the form boards 13 To facilitate their withdrawal these form blocks 31 may be beveled as shown in plan view, Fig. 18, and detail view Fig. 20. To reinforce the hanger and prevent lateral yielding thereof reinforcing plates 33 may be employed on opposite sides as shown in the plan view, Fig. 21, and in the sectional view, Fig. 22. These plates 33 are merely independent plates located beside the hanger and form blocks 31 prior to the pouring of the concrete. It is obvious that these reinforcing plates 33 may not only be used with the construction shown in Fig. 16 but may be employed in conjunction with the construction shown in Figs. 5 and 15. These plates are, in fact, the equivalent of the sides 9 of the housing shown in Figs. 1 to 4. In Fig. 19 the construction shown in Fig. 16 is illustrated without the reinforcing plates 33 while the use of such plates is shown in Fig. 22.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction, or arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain structural features, it is to be understood that the means and construction herein described comprise but one mode of putting the invention into effect and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a hanger insert for a headed member, the combination with a concrete body, having a cavity formed directly therein, of an inwardly flanged hanger embedded in said body, the flange of which overhangs the cavity, said cavity in the concrete body extending beyond the limits of the hanger with the concrete ends of the cavity for limiting the lateral adjustment of the headed member within said cavity to the range of engagement thereof by said hanger flange.

2. In a hanger insert for a headed member, a pair of substantially parallel hanger arms having inturned ends separated one from the other, and means connecting said arms fixedly one to the other and a removable core form interposed therebetween the whole being for embedment in a body of concrete or the like in which will be produced by said core form a depression of greater extent than the width of said arms into which the inturned ends of the arms will project, such depression affording beside the arms an access opening for the insertion of the headed member into the space beyond said inturned ends.

3. A pair of hanger arms having inturned ends, and an interposed removable core form, adapted to produce in a body of concrete or the like in which the hanger arms are embedded, a recess overhung by the inturned ends of said arms and having an access opening beside said inturned ends.

4. The combination with a body of self

hardening plastic material having an unlined pocket or recess therein, of a hanger embedded in the said body having a slotted terminal face forming parallel supporting ledges for an attachment member, overhanging the pocket, said pocket being of greater length than the length of said ledges, and of greater width than the space between said ledges, extending beyond the hanger to form with the slot of said hanger a key hole opening.

5. A pair of spaced hanger arms having inturned ends, to be embedded in a body of concrete or the like and a removable core form adapted to produce in the body of concrete or the like a recess into which the inturned ends of the hanger arms will project.

6. A pair of hanger arms spaced apart and having inturned ends, and a sectional mold core interposed between the ends of the arms and projecting therebeyond, the sections of said mold core being bodily removable from the recess formed thereby in a body of concrete or the like in which the arms and core mold are to be embedded.

7. A pair of hanger arms having inturned ends arranged in spaced relation one with the other, a body in which the hanger arms are embedded having therein a pocket into which the inturned ends of the arms project, an attachment member adapted to be engaged with said inturned ends and movable thereon, said attachment member being limited by the terminal walls of the pocket to a range of movement in which the attachment member maintains engagement with said inturned ends.

8. A pair of hanger arms having inturned ends arranged in spaced relation one with the other, a body in which the hanger arms are engaged having therein a pocket into which the inturned ends of the arms project, said inturned ends comprising ledges overhanging said pocket throughout a portion of its length beyond which said pocket extends to afford an access opening to the space above said ledges, the terminal wall of said access opening being so positoned as to afford a stop for an attachment member engaged with said ledges limiting the lateral adjustment of said attachment member to the range of engagement of the ledges therewith, but permitting such attachment member when turned to an abnormal position to be inserted and removed thru such access opening.

9. A pair of hanger arms having inturned ends, a body in which the hanger arms are engaged having therein a pocket into which the inturned ends of the arms project, the terminal end of the pocket being inclined and spaced away from said inturned ends to afford an access opening for a headed member, the movement of which when engaged with the inturned ends of the arms is limited by said inclined end of the pocket, substantially as specified.

10. The herein described method of affixing hanger inserts comprising engaging the hanger with a pocket form adapted to form a cavity intermediate the engaging ends of the hanger, attaching the engaged hanger and pocket or cavity form to the interior of plastic material mold or form and pouring plastic material around the hanger and engaged pocket form and subsequently removing the pocket form leaving the hanger embedded in the body of plastic material, with its engaging portion projecting into the cavity produced by said pocket form.

11. The herein described method of affixing hanger inserts comprising engaging the hanger which cavity in the finished product is overhung by the ends of the hanger with a pocket form adapted to form a cavity intermediate the engaging ends of the hanger, attaching the engaged hanger and pocket or cavity form to the interior of plastic material mold or form and pouring plastic material around the hanger and engaged pocket form whereby said hanger is embedded in the body of plastic material, with its ends overhanging the cavity afforded by said pocket form.

12. The herein described process of providing hanger inserts in concrete or other bodies of initially plastic material, comprising mounting upon the interior of the form the hanger means to be embodied, and locating in juxtaposition thereto a cavity forming mold which overlays the engaging portion of the hanger means, pouring the material in a plastic condition about the hanger means and mold and subsequently removing the mold, leaving the hanger means embedded in the body of material with its engaging portion projecting into the recess formed by the mold.

13. The combination with a hanger insert to be embedded in plastic material of a sectional core temporarily engageable with the hanger insert while the material is being placed thereabout, said sectional core being subsequently removable from the molded body to leave a cavity overhung by the engaging portion of said hanger insert.

14. The combination with an insert hanger to be embedded in a body of plastic material of a mold core detachably connected with the insert hanger adapted to support the same during the molding of the plastic material thereabout, said core being detachable from the insert hanger and removable from the molded body to afford a cavity in said body in juxtaposition to the engaging portion of the hanger.

15. The combination with an insert hanger to be embedded in a body of plastic

material of a mold core adapted to form a cavity in the body of plastic material coincident with the hanger into which the hanger projects, said core being formed in separable sections independently removable from the body of plastic material subsequent to the molding thereof.

In testimony whereof, I have hereunto set my hand this 17th day of June, A. D. 1916.

WILLIAM BAYLEY.

Witnesses:
CHARLES B. ZIMMERMAN,
M. RAY WEIKART.