H. M. PFLAGER.

METHOD OF CASTING METALLIC MEMBERS.

APPLICATION FILED JULY 8, 1909.

942,928. Patented Dec. 14, 1909.

Fig. 1.

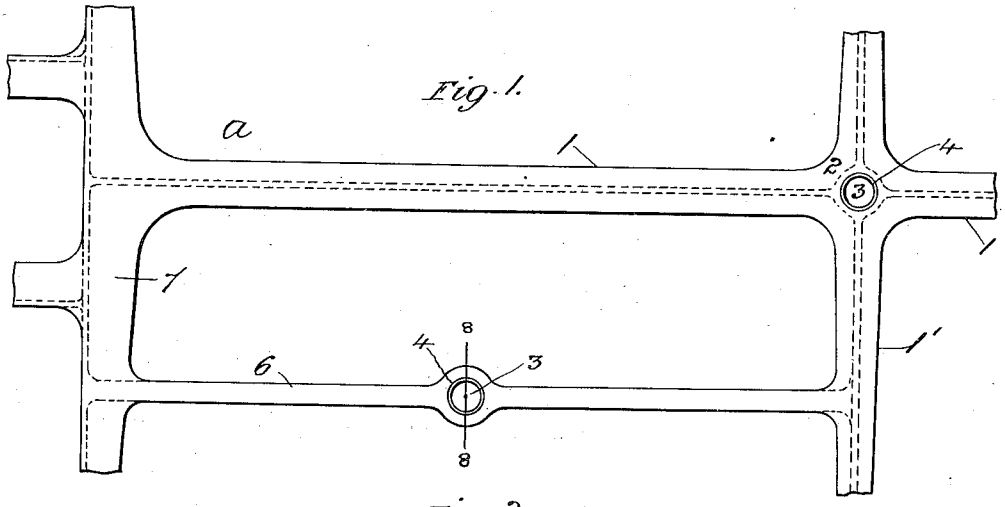


Fig. 2.

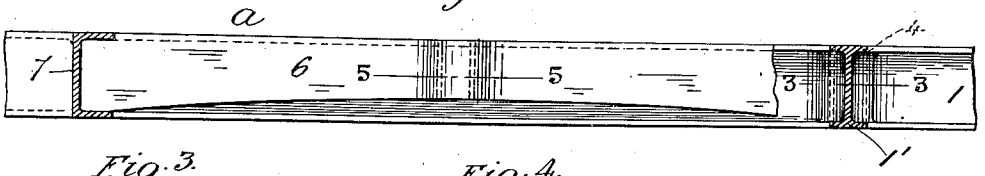


Fig. 3.

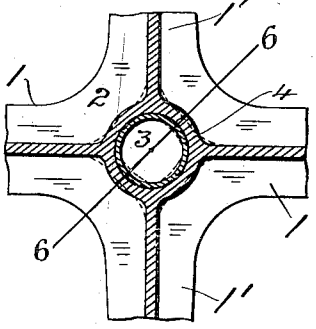


Fig. 4.

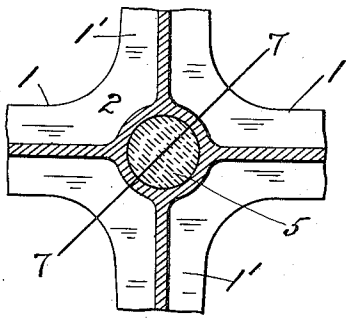


Fig. 5.

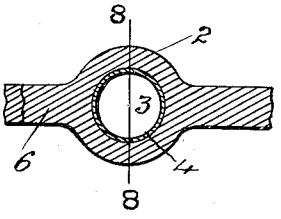


Fig. 6.

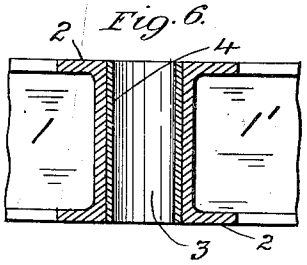


Fig. 7.

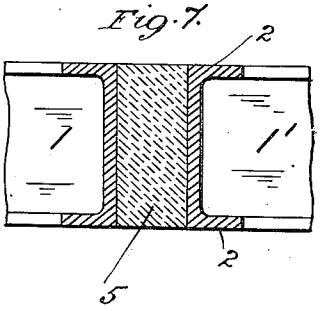
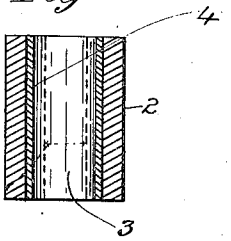


Fig. 8.



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METHOD OF CASTING METALLIC MEMBERS.

942,928. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed July 8, 1909. Serial No. 506,544.

To all whom it may concern:

Be it known that I, HARRY M. PFLAGER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Improved Method of Casting Metallic Members, of which the following is a specification.

My invention relates particularly to an improved method of and means for casting the intersecting portion of two or more intersecting metallic members, but is also applicable for casting a definite portion of a single metallic member.

Ordinarily, in casting intersecting metallic members such as two upright I-shaped beams, flat bars, and the like crossing each other at right angles or obliquely, in the same or different planes, their intersecting portion has been made solid and reinforced by corner fillets which form an enlarged area and volume of metal thereat, whereby owing to this portion of the metal being consequently slower in cooling than the said members at other parts, the latter in shrinking more rapidly, tend to pull away from and cause fracture of the members at or adjacent to their junction with the intersecting portion thereof, and likewise induce "piping" or absence of metal at the middle, or thereabout, of the said portion. Similarly, in casting a metallic member such as an upright flat bar of considerable length arranged intermediately to and connected endwise with other members arranged in different directions thereto and forming component parts of a more or less complicated structural casting, such as a car-body or tender underframe, it frequently happens that the shrinking of this metallic connecting member is more rapid than can be taken up or compensated by the slower shrinkage of its said combined structural members, thereby causing its fracture at the weakest point along the same, this result being especially liable to occur when the metal used is cast steel in which the shrinkage amounts to about one-fourth of an inch per lineal foot. Furthermore, a similar result occurs in casting a single metallic member of irregular configuration and cross section in which the rate of shrinkage correspondingly varies.

My invention has for its object to obviate this difficulty in casting and to obtain a stronger and more rigid and durable structure having a homogeneous and uniform distribution of metal throughout.

It consists in casting or forming the intersecting portion of two or more intersecting metallic members, or a definite portion of a single metallic member, yieldable, as hereinafter particularly described and claimed, reference being had to the accompanying drawing forming part of this specification, whereon,

Figure 1, is a top plan view of part of a cast steel frame showing two of its component intersecting members and a single connecting member combined respectively, with a tubular metallic collapsible core for casting or forming the said members according to my improved method; Fig. 2, a side elevation of the same showing the connecting member seen in Fig. 1 broken away at one end for clearness of illustration; Fig. 3, a horizontal section to enlarged scale through the intersecting members on line 3, 3, in Fig. 2; Fig. 4, a similar view to Fig. 3, showing the intersecting members combined with a solid collapsible core in lieu of the tubular metallic core seen in Figs. 1, 2, and 3; Fig. 5, a similar view to Fig. 3, through the connecting member on line 5, 5, in Fig. 2; Fig. 6, a vertical section taken diagonally through the intersecting members on line 6, 6, in Fig. 3; Fig. 7, a similar view to Fig. 6, taken through the intersecting members on line 7, 7, in Fig. 4, and Fig. 8, a vertical cross section through the connecting member on line 8, 8, in Figs. 1 and 5.

Like letters and numerals of reference denote like parts in all the figures.

Referring to Figs. 1, 2, 3, and 6, *a* represents part of a cast steel frame having two of its component members 1, 1′, I-shaped in cross section and intersecting each other at right angles in the same plane, their intersecting portion 2, in lieu of being solid as heretofore, being hollow or cast around and preferably, outwardly concentric with a central circular opening 3 which is formed through the casting *a* thereat in the present case preferably, by means of a metallic tubular core 4 initially inserted within the mold and around which the molten metal

is poured. On the cooling and longitudinal shrinkage of the members 1, and 1′ of the casting *a*, and consequent pull thereby on their intersecting portion 2, the latter yields and is constrained from its normal circular annular shape into a more or less practically square or flattened curved form as indicated by dotted lines in Fig. 3, and in so doing the tubular core 4 which remains embedded in the casting *a* and is sufficiently thin for the purpose correspondingly yields or partially collapses. By this method of forming the intersecting portion of a metallic member with a central opening therethrough, cooling of the surrounding metal thereat is facilitated by the circulation of air through the opening, and by the yielding of the comparatively thin and circumferentially extended annular volume of the metal around the said opening the fracture of the members 1, 1′, at their junction with the intersecting portion prevented.

In Figs. 4 and 7, a solid core 5 composed of suitable yielding or collapsible material is used to form and fill the central opening 3 through the intersecting portion 2 of the members 1, 1′, in lieu of the tubular metallic core 4 in Figs. 1, 2, 3, and 6.

6 (Figs. 1, 2, 5, and 8) represents a single rectangular-shaped metallic member which in the present case is arranged between and connected at its ends respectively, to the transverse members 1′ and 7 of the frame *a*, but may be a separate independent casting, the member 6 as shown for the purpose of emphasizing the principle of my improved method of casting, being of less depth or sectional area in the middle than at the ends, and so causing unequal shrinkage when cooling, to obviate which, the middle portion or weakest part is cast or formed around a collapsible core 4 in the same manner as before described, and so on at any other definite part of a metallic member according to its structural conditions, such as irregularity of shape or connection with other members having varying rates of cooling.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The method of casting intersecting metallic members, consisting in forming their intersecting portion around a collapsible core, substantially as described.

2. The method of casting intersecting metallic members, consisting in forming their intersecting portion around a hollow yieldable core, substantially as described.

3. The method of casting intersecting metallic members, consisting in forming their intersecting portion around a hollow yieldable metallic core, substantially as described.

4. The method of casting a metallic member, consisting in forming a definite portion thereof around a yieldable core, substantially as described.

5. The method of casting which consists in providing a collapsible core at a critical shrinkage point, substantially as described.

6. The method of casting which consists in providing a yielding core at a critical shrinkage point, substantially as described.

7. The method of casting which consists in providing a destructible core at a critical shrinkage point, substantially as described.

8. The method of casting which consists in arranging a core at the initial shrinkage point which may be distorted on the shrinkage of the metal, substantially as described.

9. The step in the art of casting which consists in arranging a collapsible core in the mold at a critical shrinkage point, substantially as described.

10. The step in the art of casting which consists in arranging a yielding core in the mold at a critical shrinkage point, substantially as described.

11. The step in the art of casting which consists in arranging a destructible core in the mold at a critical shrinkage point, substantially as described.

HARRY M. PFLAGER.

Witnesses:
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