May 13, 1958 J. S. DONAHUE ET AL 2,834,196

WELDED SHEARHEAD

Filed Aug. 26, 1955

Fig. 1.

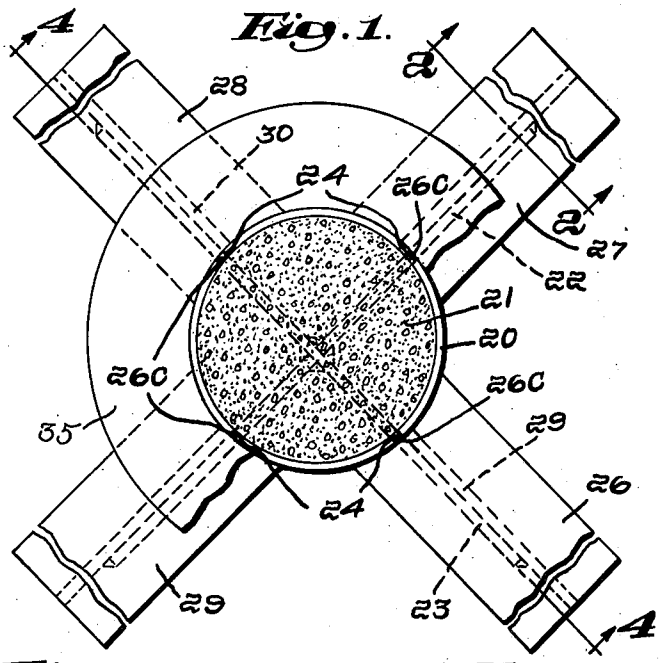


Fig. 2.

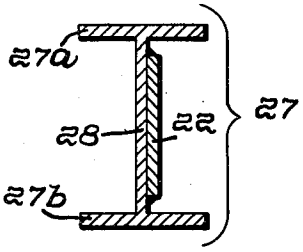


Fig. 3.

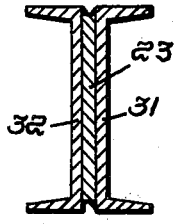
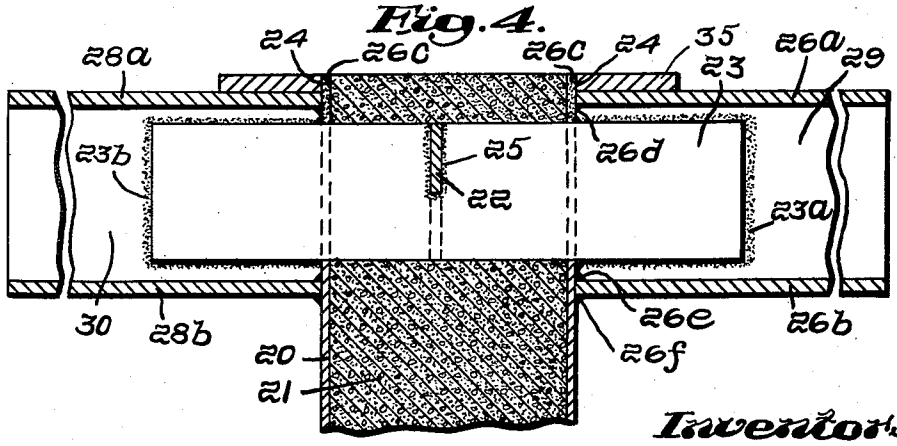


Fig. 4.



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WELDED SHEARHEAD

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Application August 26, 1955, Serial No. 530,660

1 Claim. (Cl. 72—75)

This invention relates to structural columns of the general type consisting of a concrete filled steel casing, and pertains more particularly to head frames for the connection of floor joists or reinforced concrete flooring to such columns.

The principal purpose of the invention is to provide a head frame structure through which high bending loads may be transmitted to the head of the column without distorting the column, and especially without distortion of the upper part of the casing due to tension. Another object is to provide a head frame which is integral with the column and has extending arms adapted to be connected to floor supporting members or embedded in a poured concrete structure, which occupies a minimum of space, and which may be completely enclosed within the floor structure so as to leave the ceiling below unobstructed.

Preferred embodiments of the invention are illustrated in the accompanying drawings, but it is understood that certain variations in the structure may be made without departing from the essence of the invention as defined in the appended claims.

In the drawings illustrating the invention,

Fig. 1 is a plan view of a column and head frame constructed according to the invention;

Fig. 2 is a cross-section taken along line 2—2 of Fig. 1;

Fig. 3 is a cross-section of a modification of one of the arms of the head frame taken along the same general plane as Fig. 2; and

Fig. 4 is a cross-section taken along line 4—4 of Fig. 1.

The column consists, in general, of a cylindrical steel casing **20** with a concrete core **21**. It is understood that the casing may be made of other metals and that other plastic materials of sufficiently high compression strength may be used for the core. Mounted in the top of the column is a pair of crossed plates **22** and **23**, referred to as "through" plates. The column has four slots **24** extending downward from the upper edge of the casing to receive the plates. The plates are preferably mortised at their intersection so that they will nest when assembled, as illustrated in Fig. 4. The plates are preferably welded together by fillet welds at their point of intersection all around the joint as indicated by the weld **25** in Fig. 4. The plates are also preferably welded in the slots **24** in such a manner that the weld fills any clearance space between the slots and the plates and also fills up the top of the slots so as to restore the continuity of the casing in this region.

Four arms **26**, **27**, **28** and **29** are butted against the casing **20**. In the form shown in Figs. 1, 2 and 4 these arms are I-beams having top and bottom flanges and intermediate webs. The outwardly extending ends of the through plates are welded to these webs. For example, as shown in Fig. 4, the right-hand end of plate **23** is welded to the web **29** of arm **26** by a fillet weld **23***a*,

extending all around the edge of the plate where it comes in contact with the web. The left-hand end of plate **23** is similarly welded to web **30** of arm **28** by a fillet weld **23***b*. The top and bottom flanges of the arms are cut on a curve to fit the outer side of the casing and are welded thereto by fillet welds at the top and bottom of each flange. For example, the top flange **26***a* of arm **26** has welds **26***c* and **26***d*, above and below its line of contact with the casing and the bottom flange **26***b* similarly has welds **26***e* and **26***f*, above and below its line of contact with the casing. A solid flat metal ring **35** is disposed on top of arms **26**, **27**, **28** and **29** and fits closely around the casing **20**. This ring is connected to the arms and the casing in any suitable manner, preferably by welding. This ring carries the major part of the horizontal tension resulting from a bending load applied to the arms, thus relieving tension stress on the top of the casing and preventing distortion, which would otherwise be likely to occur in the region above the through plates where the casing has been weakened by cutting the slots **24**.

In the form just described, the intersection of the through plates is slightly offset from the center of the column by a suitable amount so that the center lines of the webs of the arms will intersect at the column center. In the modification of Fig. 3, a pair of channels **31** and **32** are laid back to back against the extending end of a through plate, for example, plate **23**. The channels are welded to the plate at the top and bottom. When this form of arm is employed the through plates are set so that their intersection is at the center of the column.

A head frame constructed as described above is a strong unitary structure adapted to transmit shear and bending loads from an overlying floor structure to the head of a column without straining the column casing out of round. The frame may be readily pre-assembled and dropped on to a column and welded in place before the concrete core is poured. The arms **26**, **27**, **28** and **29** are equally suitable for bolting to floor girders, or for embedding in a floor slab in a reinforced concrete structure of the type which is poured in place around the column. It is understood that a second column may be mounted above the head frame and connected by means of anchor bolts, or any suitable splice, in which case the ring **35** may serve as a head plate for attaching the base of the upper column.

What is claimed is:

In a column of the type having a hollow cylindrical casing and a plastic core, the casing having an upper margin and oppositely disposed upright slots in said margin; a head frame comprising a through plate embedded in said core having end portions passing through said slots and projecting outward from said casing, the slots being deeper than the plate so that part of said margin lies above said plate; an integral flat ring disposed horizontally around the upper part of said margin and having an inner edge closely engaging said casing; and a pair of beams disposed outside said casing, each beam having an upright web attached to one of said plate end portions and a top flange close to and attached to said casing, said top flange lying below and being attached to said ring.

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