

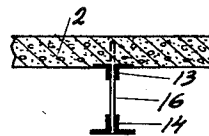
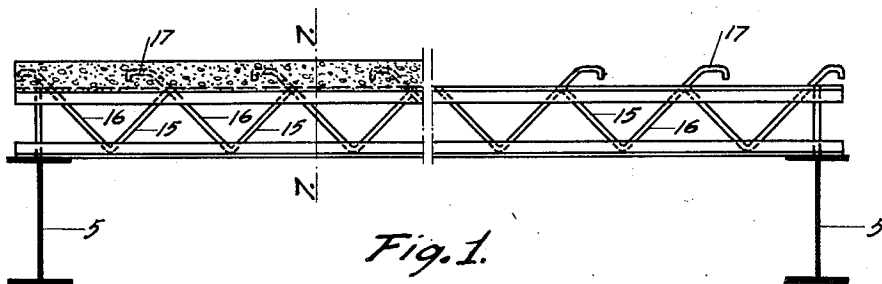
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R. K. O. SAHLBERG

1,979,643

COMPOSITE BEAM

Filed March 7, 1934



INVENTOR.

Rolf K. O. Sahlberg

BY 9

Frank L. Aven

ATTORNEYS.

## UNITED STATES PATENT OFFICE

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## COMPOSITE BEAM

Rolf K. O. Sahlberg, New York, N. Y.

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1 Claim. (Cl. 72-70)

This invention relates to a beam construction composed of a steel beam, rolled or otherwise fabricated acting together with a concrete or other slab, resting on the top flange of the beam and bonded to the same with sufficient rigidity as to restrain the sheer stresses developed from the load. The concrete or other slab together with the top flange of the steel beam forms a zone in compression of the composite beam.

More especially my invention relates to beams in which the concrete or other slab constitutes the floor when the composite members are spaced in accordance to load and span.

My improved composite beam is not limited to the use of a concrete slab carried by the top flange but may be used in connection with slabs or plates of other materials capable of restraining compressive stresses.

Therefore in referring in the following description to concrete slabs, I intend to include in that expression slabs of other material which may be used in place of the concrete.

It is possible with my improved composite beam to make use of a suitable filling material wholly embedding the web and lower flange of the steel beam, in order to make the construction fire-proof.

The main object of my improved composite beam is to secure a connection between the concrete slab and the top flange of the steel beam of sufficient rigidity as to develop the same deformation in the concrete slab as in the top flange of the steel beam.

In order that my invention may be better understood attention is directed to the accompanying drawing forming a part hereof and in which

Figure 1 is a side elevation of my improved composite beam illustrating the arrangement by which the concrete slab and the top flange of the steel beam are connected together. At the left half of this view the concrete slab is shown, the right half of the view showing the steel beam without the concrete slab.

Figure 2 a cross sectional view on the line 7-7 of Figure 1.

The composite beam shown in Figures 1 and 2 is formed of a steel beam composed of a top chord 13 formed of two angle irons, a bottom chord 14 likewise formed of two angle irons and a web system 15 and 16. The concrete slab 2 rests upon and is connected to the top chord through the extended diagonals 16. These diagonals 16 being tension members in the web system are extended through the top chord 13 and are anchored in the

concrete slab by hooks 17 formed at the ends of the diagonals 16.

With the arrangement of composite beams above indicated, I make use of a concrete slab as part of the zone in compression for resisting bending moments. By doing this a considerable saving in steel is effected because the steel area in the top flange has only to be designed to carry the weight of the concrete slab. In consequence the saving of steel in this part of the composite beam as compared to a regular beam is in the same proportion as the weight of the concrete slab to the total load.

Furthermore, an additional saving of steel in the bottom flange is obtained owing to the fact that the level arm between the tension and compression zone in my improved composite beam is in percentage considerably greater than with the regular steel beam. The saving of steel in the bottom flange is in proportion to these level arms.

My improved beams may be manufactured in such manner that the steel beam comprising the top and bottom flanges with the connecting web either solid or open is provided with a camber. By that I mean that the beam is slightly curved and when the beam is placed on the job, the apex of the curve extends upwardly. This precamber is very small, only a fraction of an inch, and is so chosen that the weight of the concrete slab and beam will develop a deflection of the steel beam equal to the precamber. In this manner the steel beam will be straight and even when the concrete slab has hardened.

Having now described my invention what I claim is new therein and desire to secure by Letters Patent is as follows:

An improved composite beam supported at its ends and comprising upper and lower chords and an intermediate web system consisting of diagonals extending between said chords, the extended diagonals in tension of the web system being formed with hooked ends extending above the upper chord and a concrete slab carried by and anchored to the upper chord by said hooked ends with sufficient rigidity as to form in cooperation with the upper chord the zone in compression of the composite beam.

ROLF K. O. SAHLBERG.

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