No. 775,927. PATENTED NOV. 29, 1904.

J. KAHN.

SELF CENTERING PLATE.

APPLICATION FILED FEB. 6, 1904.

NO MODEL.

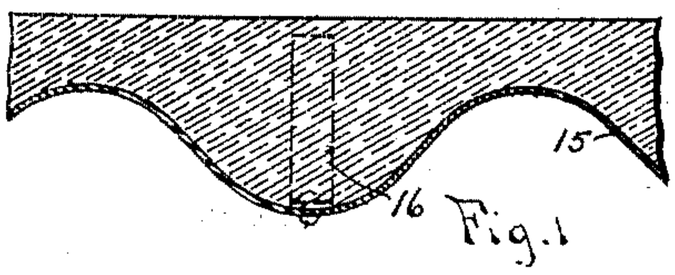


Fig. 1.

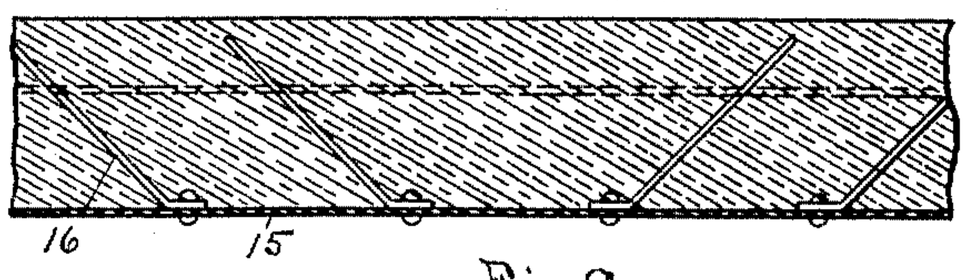


Fig. 2.

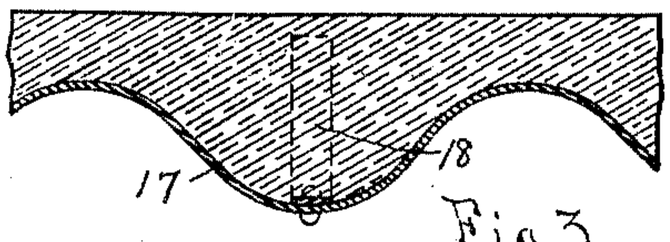
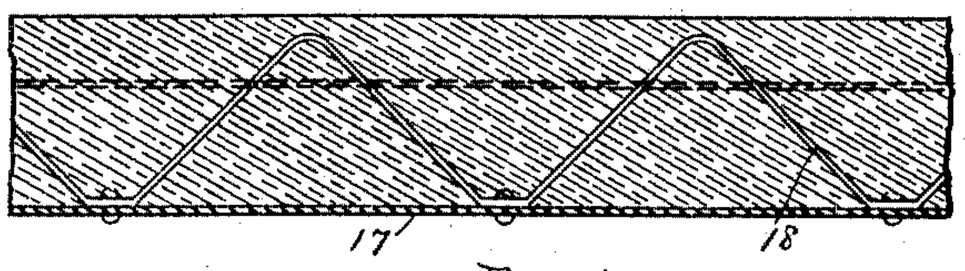


Fig. 3.



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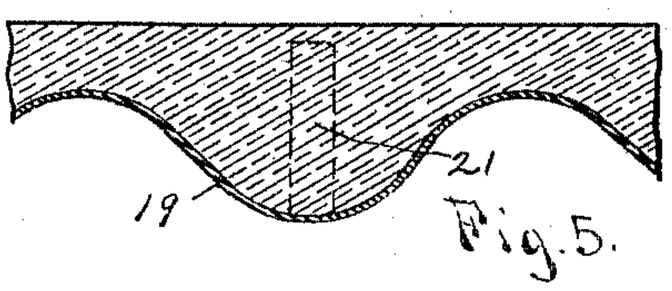

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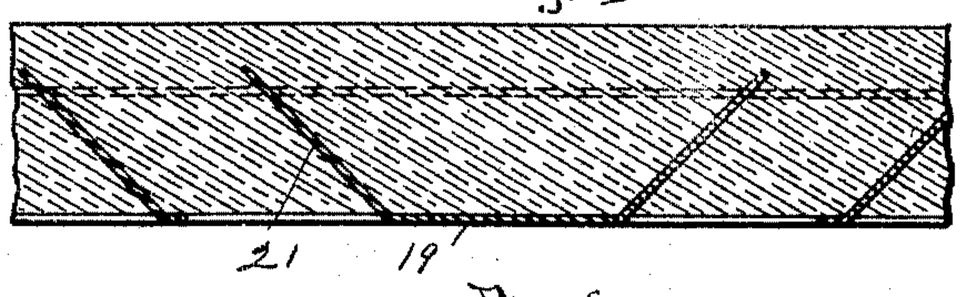

Fig. 6.

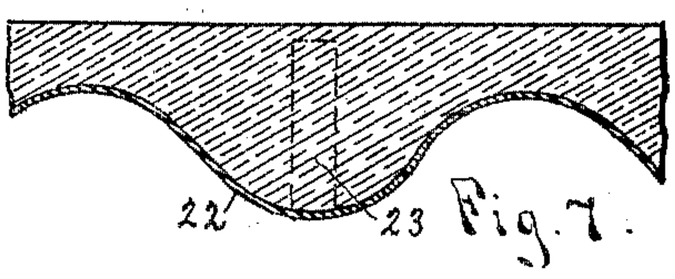

Fig. 7.

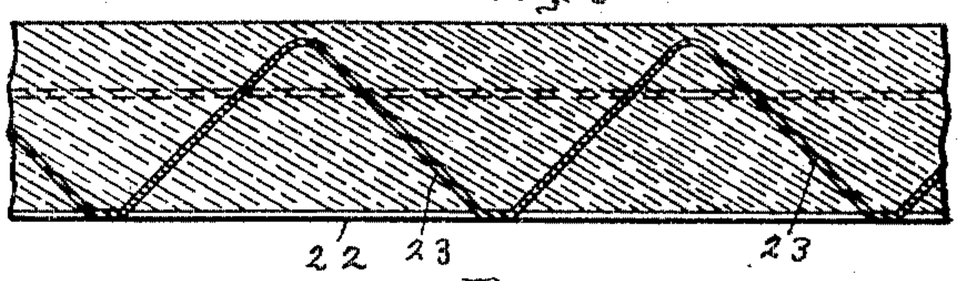

Fig. 8.

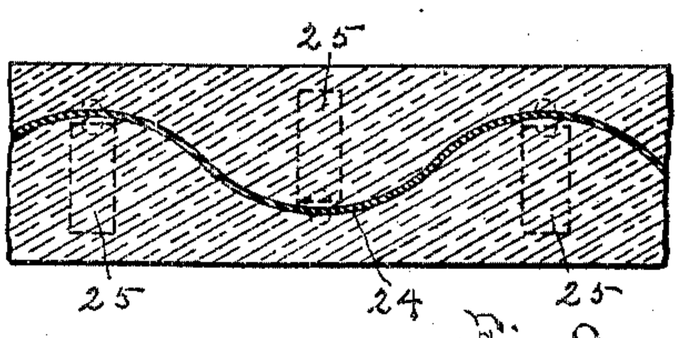

Fig. 9.

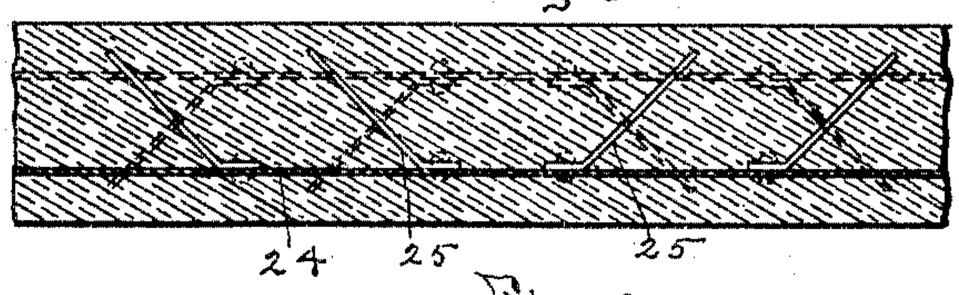

Fig. 10.

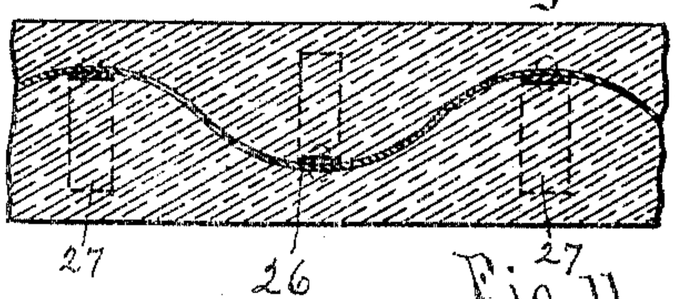

Fig. 11.

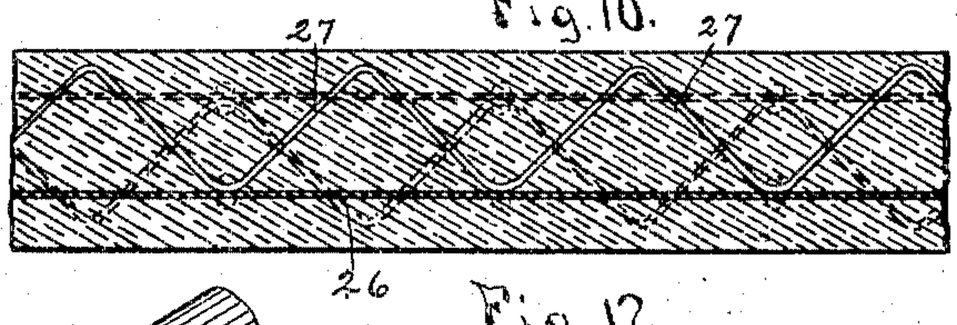

Fig. 12.

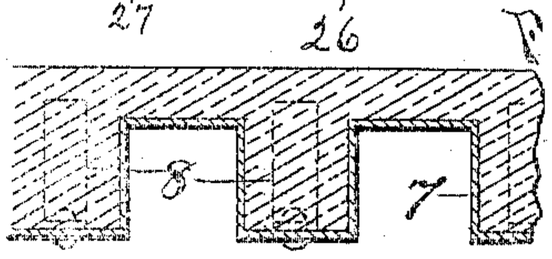

Fig. 14.

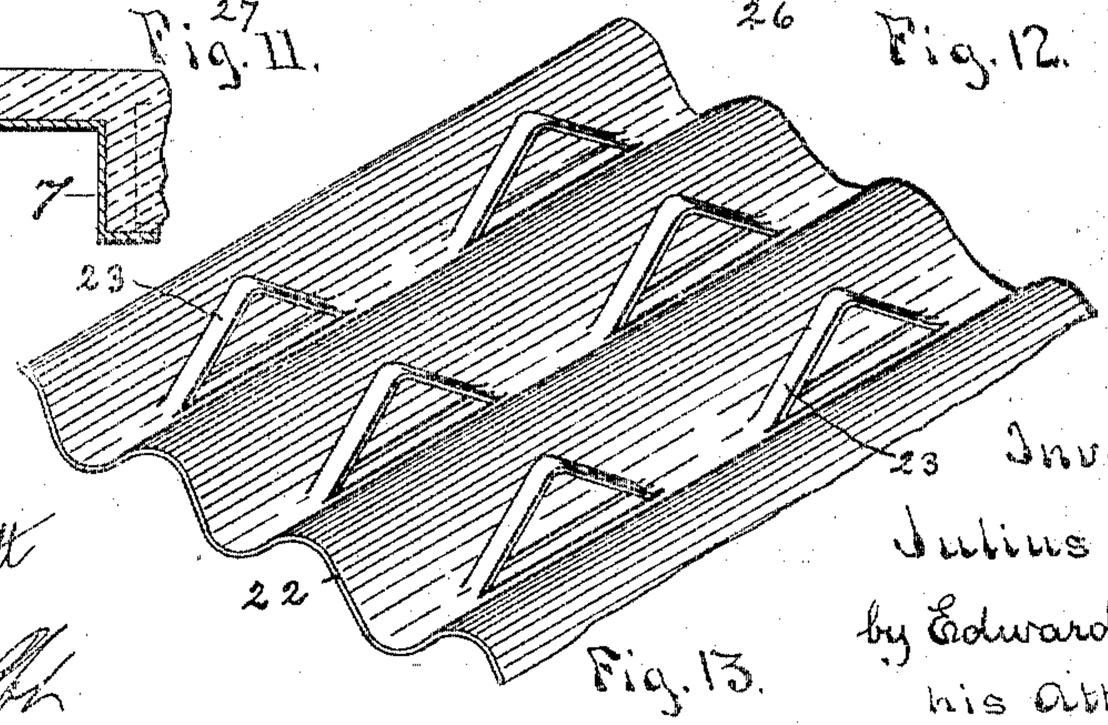

Fig. 13.

Witnesses.

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Fred Hoffe

Inventor.

Julius Kahn.

by Edward N. Pagelsen.

his Attorney.

No. 775,927. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

JULIUS KAHN, OF DETROIT, MICHIGAN.

SELF-CENTERING PLATE.

SPECIFICATION forming part of Letters Patent No. 775,927, dated November 29, 1904.

Application filed February 6, 1904. Serial No. 192,323. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KAHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Self-Centering Plate, of which the following is a specification.

This invention relates to the metal reinforcement for concrete trusses, such as beams, floors, ceilings, and partitions; and the object of my improvements is to provide a self-centering plate that will serve to support the concrete of a reinforced truss while the self-hardening material is still plastic and also to act as the tension member of the completed truss. Some of the various means for carrying out my invention are illustrated in the accompanying drawings, in which—

Figures 1 and 2 are transverse and longitudinal cross-sections of a corrugated self-centering plate having tongues riveted to the bottoms of the corrugations. Figs. 3 and 4 show a similar plate with strips riveted to the same to form loops. Figs. 5 and 6 show a similar plate with tongues cut from the body of the same. Figs. 7 and 8 show a similar plate with loops cut out of the same. Figs. 9 and 10 show a corrugated plate with tongues riveted to the same on both sides and extending into the concrete. Figs. 11 and 12 show a similar plate with loops riveted to both sides of the same, and Fig. 13 shows the plate of Figs. 7 and 8. Fig. 14 is a cross-section of a self-centering plate with rectangular corrugations to form deep beams connected by shallow portions.

Similar reference characters refer to like parts throughout the several views.

In constructing stone arches it is necessary to use false work, generally of timber, to support the stone until the keystone is in place, which false work is called the "centering" of the arch. When trusses were first used, the false work necessary in their construction was also called "centers" or "the centering," terms now applied to the molds used in building combined concrete and steel beams. Where such false work can be dispensed with in the construction of a beam or floor, the structure is called "self-centering." In using centering or centers for combined concrete and steel trusses—such as beams, floors, ceilings, and partitions and reinforced concrete structures of any other description—false work or centers must first be erected. The reinforcing metal rods are then supported in the desired positions and the concrete rammed in place. To avoid this labor and expense, I provide a plate of a length equal to the span desired and as broad as can be secured and having secured to it or integral therewith a series of auxiliary tension members in parallel rows or staggered, which shall be molded into the concrete, so as to take up and transmit the tension stresses to the plate. A further object of these auxiliary members is to stiffen the plate vertically and to serve generally as the web members of the truss. The ends of the plate will rest on the abutments of the trusses, and the concrete can be laid on the plates to the depth desired. For long spans it may be necessary to support the plates at points intermediate their length until the concrete hardens.

In Figs. 1 and 2 I have shown a truss built up of concrete and a corrugated plate 15, having lines of tongues or auxiliary tension members riveted to the bottoms of the corrugations and extending upward, the auxiliary members being inclined from the perpendicular and both ways from the middle of the plate. These tongues are so embedded in the concrete as to take up the tensional stresses that develop and transmit them to the plate and after passing the middle of the beam transmit them from the plate to the concrete again, where they appear as compression stresses, which the concrete is admirably adapted to bear. The thickness of the plate, the depth of the corrugations, and the number and dimensions of the tongues will depend on the load.

In Figs. 3 and 4 the tongues are struck up from the plate instead of being riveted to the same. Figs. 3 and 4 show a truss of this type in which the plate 17 has flat strips 18 riveted to it in a manner to form loops, the top of the loops extending above the corrugations. The advantages of this construction are perfect union with the concrete, that the

loops will be perfect web members of the truss and stiffen the plate vertically, and that in shipping the auxiliary members will not become bent down so easily as where tongues such as shown in Figs. 1 and 2 are employed. In Figs. 7, 8, and 13 these loops are shown to be formed by being struck up from the plates.

For the same amount of metal and concrete corrugated plates of this kind form stronger trusses than when flat plates are employed. The arching of the metal plates serves to render them much stiffer and better able to support the concrete while the beam is being formed. These corrugations instead of being curved may be rectangular, as shown in Fig. 14.

It may be desirable to place the tension member at or near the center of the beam or truss, in which case constructions such as shown in Figs. 9 to 12, inclusive, will be of value. In each of these the auxiliary tension members project from both sides of the plate. In one case tongues 25 are secured to the bottoms of the corrugations, while in the other metal strips 27 are used. While these trusses will primarily be used for floors and ceilings, they will be found of great value as partitions, their rigidity rendering them desirable where horizontal pressure must be overcome, as in grain-bins.

Having now explained my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a self-centering floor, the combination of corrugated plates extending over the entire surface of said floor, concrete carried by said plates, auxiliary tension members projecting upward from the bottom and above the tops of the corrugations and embedded in the concrete to transmit the tension stresses from said concrete to said plate, said plate and auxiliary members alone forming the tension members of a truss of which the concrete is the compression member.

2. In a self-centering floor, the combination of corrugated plates extending over the entire surface of said floor, concrete carried by said plates, auxiliary tension members struck up from the bottoms of the corrugations and projecting upward beyond the tops of the same embedded in the concrete and inclined so as to intersect the usual lines of fracture of composite beams, all said auxiliary members on each side of the middle of the plate being inclined from the middle at the same angle.

3. In a combined concrete and metal structure, the combination of corrugated metal sheets extending over the entire surface of said structure, concrete carried by said metal sheet, auxiliary tension members projecting outward on both sides from the bottoms and beyond the tops of the corrugations and embedded in the concrete to transmit the tension stresses from said concrete to said plate, said plate and auxiliary members alone forming the tension members of a truss of which the concrete is the compression member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS KAHN.

In presence of—
ANNA M. GREGORY,
EDWARD N. PAGELSEN.