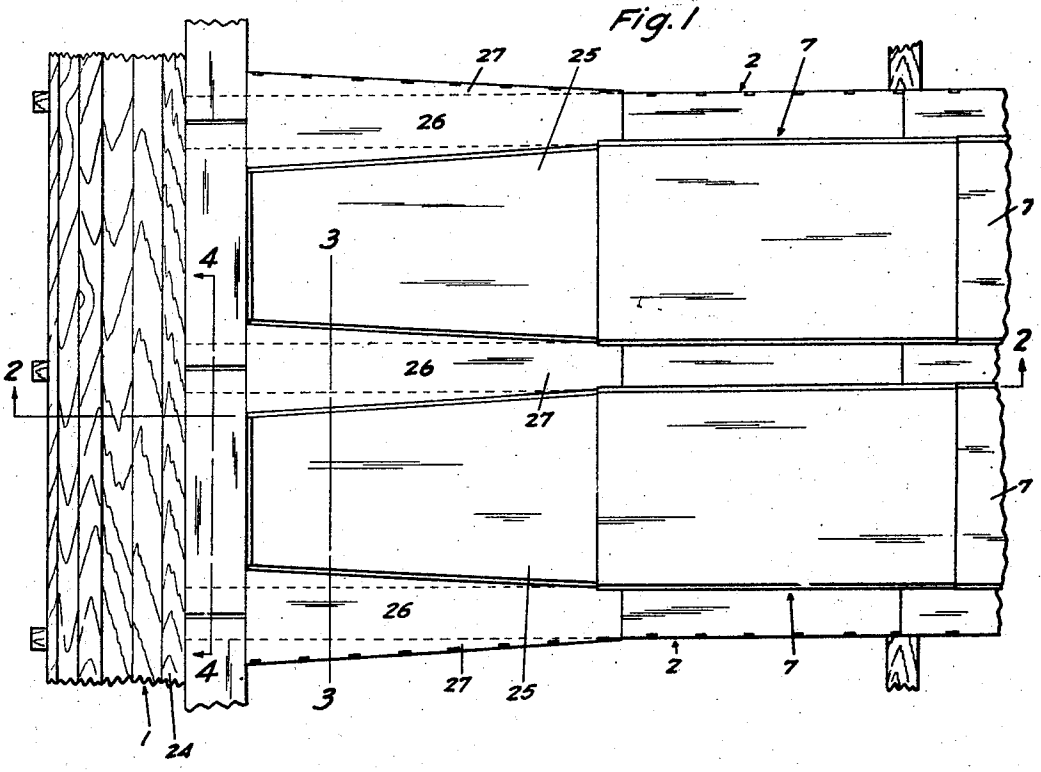
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Fig. 1



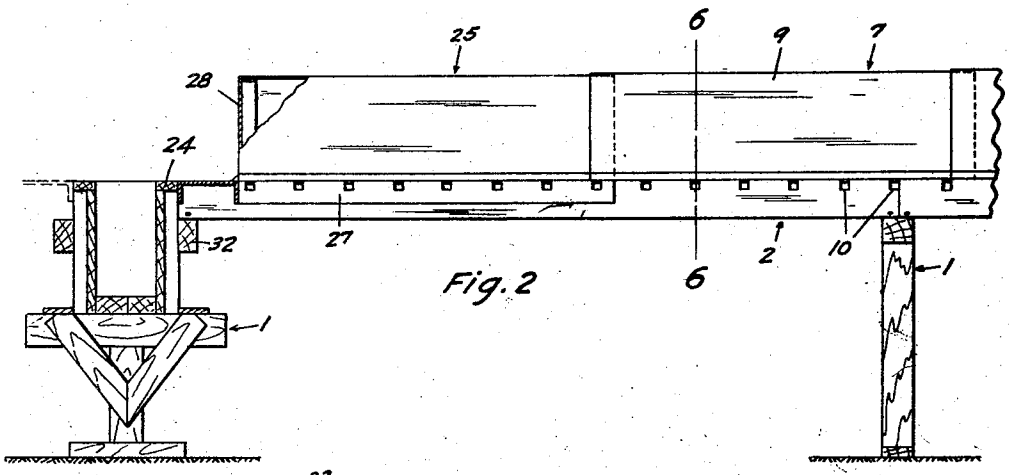


Fig. 2

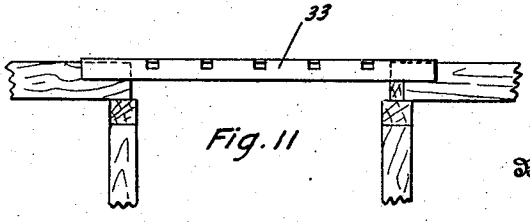


Fig. 11

Inventor

John J. Morgan

By W. S. McDowell

Attorney

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Fig. 3

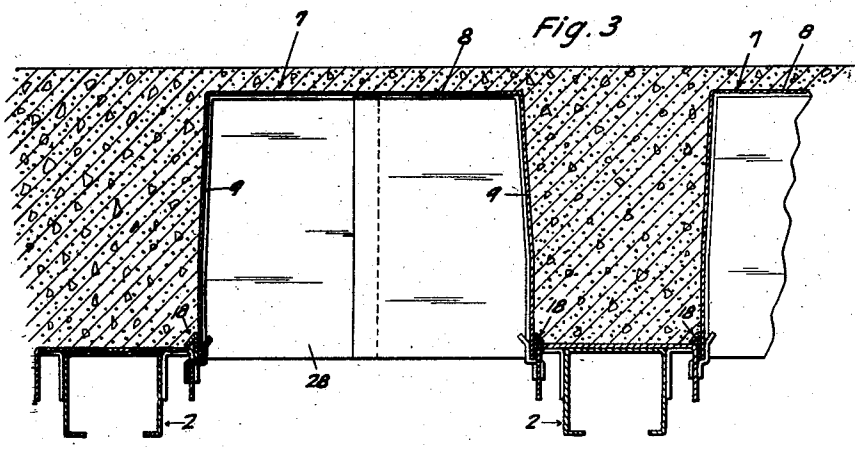


Fig. 4

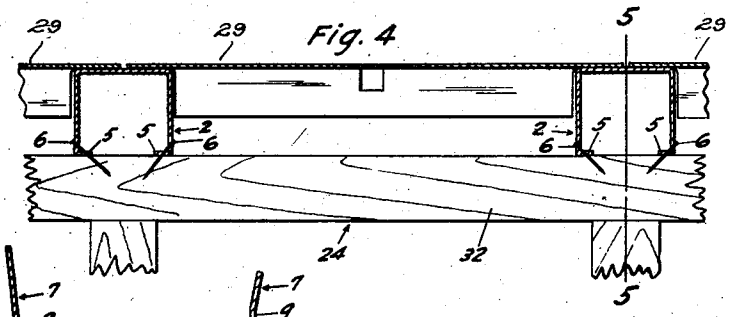
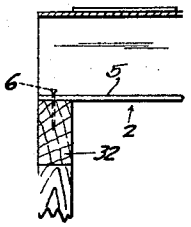


Fig. 5



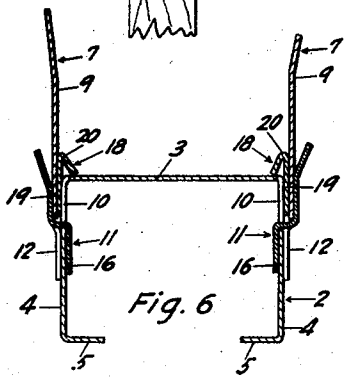
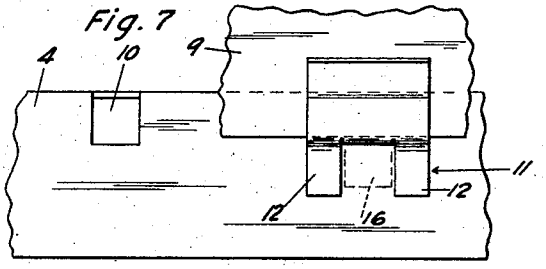


Fig. 6

Fig. 7



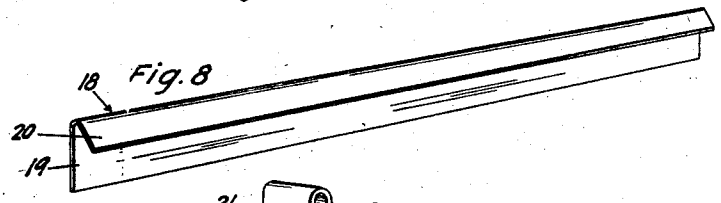


Fig. 8

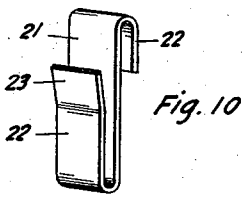


Fig. 10

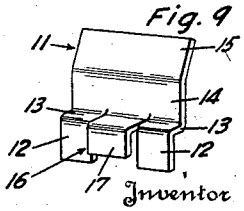


Fig. 9

Inventor

John J. Morgan

By W. S. McDowell

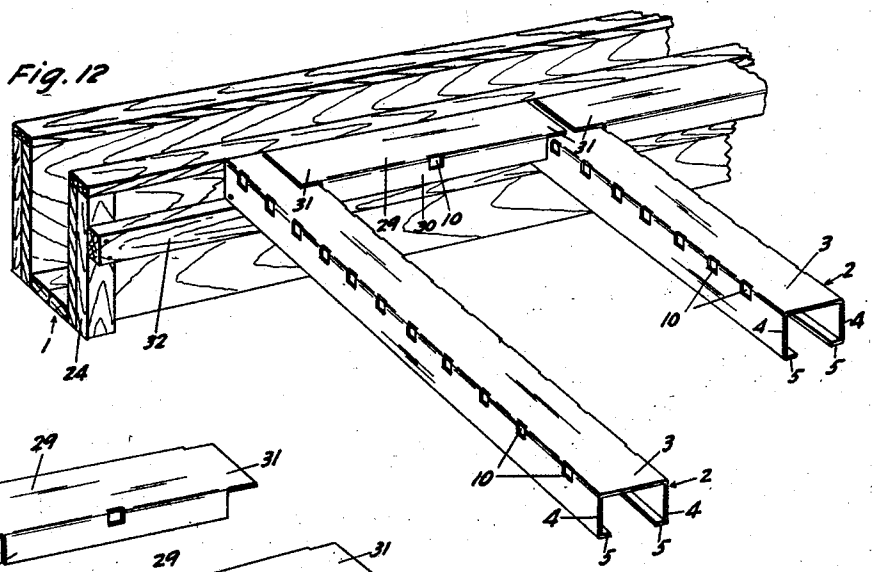
Attorney

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Fig. 12



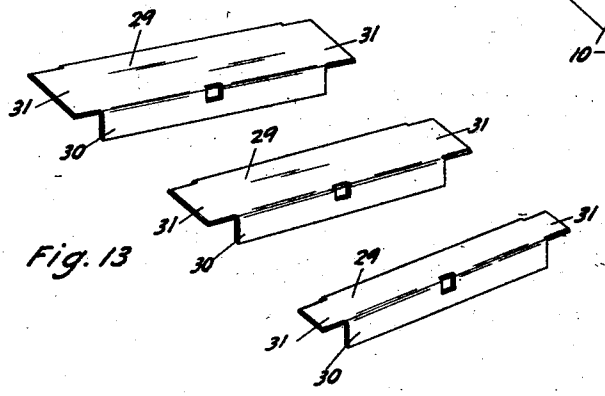


Fig. 13

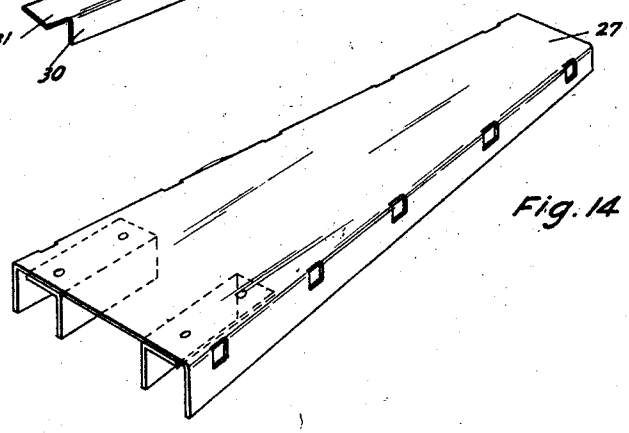


Fig. 14

John J. Morgan Inventor

By W. S. M Gowell

Attorney

Patented Aug. 4, 1931 1,817,757

UNITED STATES PATENT OFFICE

JOHN J. MORGAN, OF COLUMBUS, OHIO

APPARATUS FOR FORMING CONCRETE FLOORS

Application filed February 11, 1929. Serial No. 339,039.

This invention relates to apparatus for use in the forming or laying of concrete floors or other beds or layers of monolithic material, such as are employed in the construction of various types of buildings.

It is a primary object of the present invention to provide improved means for effecting the support and retention of the forms or cores which are employed as foundation members for the concrete during the pouring, forming and hardening of the monolithic substances.

With these and other objects in view, as will appear as the description proceeds, the invention consists in the novel features of construction, combinations of elements and arrangements of parts hereinafter to be more fully described and pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a plan view of the apparatus comprising the present invention,

Figure 2 is a vertical sectional view taken through the apparatus on the plane indicated by the line 2—2 of Figure 1,

Figure 3 is a transverse vertical sectional view taken on the line 3—3 of Figure 1,

Figure 4 is a similar view on the plane indicated by the line 4—4 of Figure 1,

Figure 5 is a detail sectional view on the line 5—5 of Figure 4,

Figure 6 is a transverse sectional view taken on the line 6—6 of Figure 2,

Figure 7 is a side elevation of the structure disclosed in Figure 6,

Figure 8 is a detail perspective view of the bevelled corner strip,

Figure 9 is a similar view of one of the removable soffit clips,

Figure 10 is a similar view of a slightly modified form of clip,

Figure 11 is a sectional view disclosing one of the center extensions,

Figure 12 is a detail perspective view showing the end supports for the metallic soffits and also the removable spacing members in connection therewith,

Figure 13 is a detail perspective view showing a plurality of spacers, indicating their various dimensions,

Figure 14 is a perspective view of one of the tapered form supports.

Referring more particularly to the drawings, the numeral 1 designates a wooden sub-frame which is mounted upon a lower floor and is employed to effect the support of the cores, forms and soffits employed in the erecting of a superposed concrete floor.

The frame 1 is constructed to effect the support of a plurality of parallel, longitudinally extending and transversely spaced metallic soffits 2. In the present instance each of these soffits is formed from a rather heavy gauge thickness of sheet metal, suitably formed or bent to produce an upper horizontally extending wall 3, spaced vertical side walls 4 and inwardly bent base flanges 5, producing in cross-section a structure of substantially rectangular design. As shown in Figure 4 the flanges 5 rest directly upon the upper portions of the sub-frame 1 and are retained in desired spaced positions by the employment of nails 6 or the like which are driven through openings provided in the lower portions of the soffits into the timbers comprising the upper members of the frame 1. Soffits of this general construction have been disclosed in my prior application, Serial No. 300,351, filed August 17, 1928.

Supported between the soffits and extending parallel therewith are inverted U shaped forms or cores 7. The latter include flat horizontal upper walls 8 and slightly downwardly and outwardly inclined side walls 9—9, said forms or cores being substantially open bottomed. Normally, these forms are disposed in planes above the soffits 2 to produce the customary concrete floor of arched and ribbed construction, the ribs of the floor being formed above the soffits 2, while the arches in the floor are produced by the upstanding forms or cores 7.

In order to effect the support of the forms or cores in connection with the soffits 2, the walls 4 of said soffits, contiguous to the upper wall 3 thereof, are formed with vertical slots 10, produced in the soffit at the time the latter is manufactured. These slots are employed to effect the support of a plurality of removable metallic clips 11, es-

pecially those of the type disclosed in Figures 6, 7 and 9.

Each of the clips 11 is formed from a single piece of sheet metal and stamped to form a pair of spaced legs 12. The upper ends of these legs terminate in outwardly and angularly directed shoulders 13, and the shoulders 13 in turn terminate in an upwardly directed web 14, which occupies a different vertical plane from the legs 12, the upper ends of the web terminating in an outwardly and angularly directed lip 15.

Formed with the clip is an angular prong 16 which includes a vertical depending wall 17 arranged to occupy an inwardly off-set plane as regards the plane of the legs 12, the walls 17 being off-set corresponding approximately to the thickness of the walls 4.

Thus, in practice, the clips are positioned at longi udinally spaced intervals along the lengths of the soffits. This is accomplished by inserting the prongs 16 into the slots 10 and then by forcing the clips downwardly the prongs 16 are engaged with the interior surface of the walls 4 so as to retain the clips securely in connection with the soffits. Due to the fact that the web 14 is off-set from the wall 4, a space is provided to permit of the insertion and reception of the lower edges of the form 7 so that the latter may be supported by the soffits through the medium of the clips 11. It will be observed that the prong 16 engages with the inner surfaces of the wall 4 while the legs 12 engage with the outer surface of the wall. This produces a rigid clip which retains its position unless deliberately removed. These clips may be economically produced and are capable of being used for successive operations.

Following the erection of the soffits 2 and the forms 7 the flooring may be poured to permit of the formation of the concrete floor. I prefer to use bevelled strips 18 of the type disclosed particularly in Figures 6 and 8. These strips include a vertical wall 19 which is inserted between the side wall of the soffit and the inner walls of the forms 7, the strips then terminate in downwardly and angularly directed lips 20 which effectively seal the joints between the lower portions of the forms or cores and the soffits, whereby when said cores or forms are finally removed, following the drying of the floor, a sharp cornered appearance is provided which is devoid of the usual ragged edges which are apt to be present when the strips 18 are omitted.

A clip of the type disclosed in Figure 10 may be employed in lieu of that illustrated in Figure 9. The clip disclosed in Figure 10 comprises a central web 21 which terminates at its opposite ends in reversible wings 22, one thereof being provided with a flaring end 23. This clip may be inserted either into the slots 10 of the soffit which are provided in the side walls 4 or into the corresponding slots produced in the upper wall 3 of the soffit.

In many instances it is desirable to thicken the ribs or vertical compression elements of the concrete floor, where said elements merge into the main girder members produced by the forms 24. This is obtained by the employment of end forms or cores 25, which mesh or register with the forms or cores 7. The cores 25, however, taper inwardly from the end thereof which adjoin the cores 7 in order to produce wedge shaped spaces 26 between the forms or cores 25 to provide for the widening rib construction of the flooring.

In order to effect the support of the forms or cores 25 there is placed on the ends of the soffits 2, adjacent to the girder forms 24, substantially triangular form supports 27 which conform to the shape of the spaces 26. The supports 27 are adapted to receive the clips 11 in order to effect the support of the cores 25 in substantially the same manner as the cores 7. The cores 25 correspond generally in construction and function to the cores 7, with the exception that the cores 25 are of tapering form, as illustrated in Figure 1, and also the cores 25 are provided with closed end walls 28, which are used in forming the girder or rib construction of the concrete flooring.

The spacing of the end cores 25 from the main girder members is effected by means of the spacers disclosed in Figures 12 and 13 especially. These spacers are of metallic construction, being U shaped in cross-section. Thus, each of the spacers comprises a top wall 29 and depending side walls 30. The side walls 30 may be provided with the slots 10 for the reception of a clip 11 used in engaging the end walls 28 of the cores 25. The top walls 29 are extended to produce wings 31 at the opposite ends of the spacers. These wings overlap the top of the soffits 2, while the vertical end edges of the walls 30 engage with the side walls 4 of the soffits. These spacers may possess desired dimensions for the purpose of adapting the same to cores 25 of different lengths and tapers and to provide variable widths of the girder members. The soffits 2 are connected with a rail 32 forming a part of the girder formation 24. This arrangement provides for the secure retention of the soffits in operating positions. The soffits are of any desired length and their meeting ends overlap the upright members of the sub-frame 1, as shown in Figure 2. The upright members of the sub-frame may, as shown in Figure 11, be bridged by means of transverse metallic extensions 33. The forms or cores 7 and 25 are preferably formed from smooth sheet metal, the adjacent ends of the cores being overlapped or nested, as shown in Figure 2, to present an uninterrupted and continuous form. After these forms have been set the concrete in the plastic state

is poured in on top of them, as shown in Figure 3. The shape of the form results in imparting the desired cross-sectional formation to the concrete form or bed and are thus produced. In Figure 3 there has been shown a standard form of flooring employed in the development of many concrete buildings. After the flooring has hardened to a certain extent, although not necessarily completely, the clips 11 may be removed from engagement with the soffits. This is accomplished by forcibly turning the clips in a downward direction, and under normal conditions there is sufficient freedom between the form or core 7 and the walls of the slots 10 to permit the clips to be removed without mutilation. The forms or cores 7 may then be dropped and reemployed for producing additional floors. When the forms 7 are removed the bevel strips 18 are removed, leaving the lower edges of the concrete rib smooth and well finished. This is particularly desirable in buildings where the so-called "suspended ceiling" is not used and where the ribs constitute a portion of the ceiling of the floor below.

What is claimed is:

1. In apparatus of the character described, a plurality of longitudinally extending parallel transversely spaced soffits, a plurality of metallic forms of substantially U shaped formation in cross-section, the side walls of said forms terminating immediately adjacent to the side walls of said soffits, means carried by said soffits for effecting the support of said forms, and a plurality of corner strips wedged between the adjoining walls of said forms and soffits, said strips being provided with inclined portions, which serve to seal the joints between said forms and soffits.

2. In apparatus of the character described, a sub-frame, a plurality of longitudinally extending parallel transversely spaced soffits mounted upon said sub-frame, and a plurality of metallic spacing devices extending transversely between said soffits, said spacing members being of U shaped configuration and having the ends thereof provided with extensions arranged to overlap the walls of said soffit, the vertical walls of said spacers having the ends thereof engaged with the side adjoining walls of a pair of soffits.

3. In apparatus of the character described, a sub-frame, a plurality of longitudinally extending parallel transversely spaced soffits mounted upon said sub-frame, a plurality of metallic spacing devices extending transversely between said soffits, said spacing members being of U-shaped configuration and having the ends thereof provided with extensions arranged to overlap the walls of said soffit, the vertical walls of said spacers having the ends thereof engaged with the side walls of a pair of soffits, and metallic filler plates overlapping said soffits adjacent said spacing members, said filler plates having a horizontal top wall and vertical converging side walls, the inner ends of said side walls being adjacent the sides of said soffit and the opposite ends being spaced equi-distant from the side walls of said soffit an engaging the side walls of said spacing members.

4. In apparatus of the character described, a supporting framework, a plurality of longitudinally extending parallel transversely spaced soffits mounted upon said framework, and metallic filler plates slidably received on said soffits adjacent said supporting framework, said filler plates having their top walls adjacent and parallel to the top walls of said soffits and their side walls in converging relation with the side walls of said soffits, the inner ends of said side walls being adjacent the side walls of said soffits and the outer ends spaced equidistant therefrom and engaging said supporting framework.

5. In apparatus of the character described, a framework, a plurality of parallel longitudinally extending transversely spaced metallic soffits supported horizontally by said framework, a plurality of metallic spacing devices extending transversely between said soffits and adjacent said framework, said spacing members being of substantially U-shaped configuration and having the ends thereof provided with extensions arranged to overlap the walls of said soffit, the vertical walls of said spacing devices having the ends thereof engaged with the side adjoining walls of a pair of soffits, and metallic filler plates slidably received on said soffits adjacent said spacing members, said filler plates being adjustable longitudinally of said soffits and having their top walls extending longitudinally of and resting upon the top walls of said soffits and their vertical downwardly directed side walls in converging relationship with the side walls of said soffits, the inner ends of the side walls of each of said filler plates being adjacent the opposite side walls of one of said soffits, the outer ends of said side walls being spaced equi-distant from the side walls of said soffit and engaging said framework.

6. In apparatus of the character described, a framework, a plurality of parallel longitudinally extending transversely spaced metallic soffits supported horizontally by said framework, metallic filler plates positioned on said soffits, said filler plates having their top walls extending longitudinally of and resting on the top walls of said soffits and their vertical downwardly directed side walls extending angularly with respect to the side walls of said soffits, the inner ends of the side walls of each of said plates being adjacent the side walls of one of said soffits, the outer ends of said side walls being spaced equi-distant from the side walls of said soffit, and a plurality of metallic spacing devices extending transversely between said soffits and po-

sitioned between the outer ends of said filler plates and the ends of said soffits, said spacing members being provided with a horizontally extending top wall arranged to overlap said soffits.

In testimony whereof I affix my signature.

JOHN J. MORGAN.