

July 13, 1943.

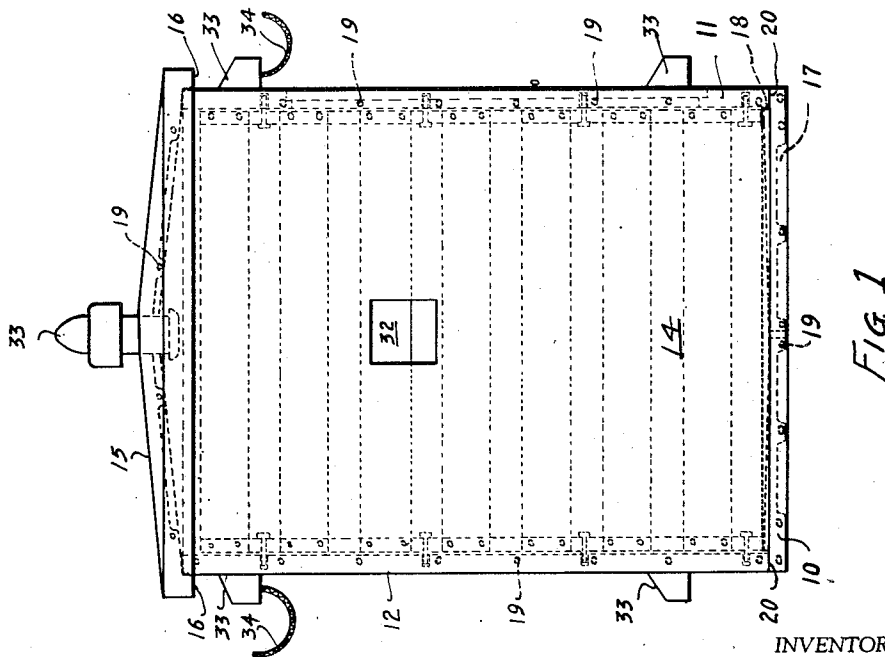
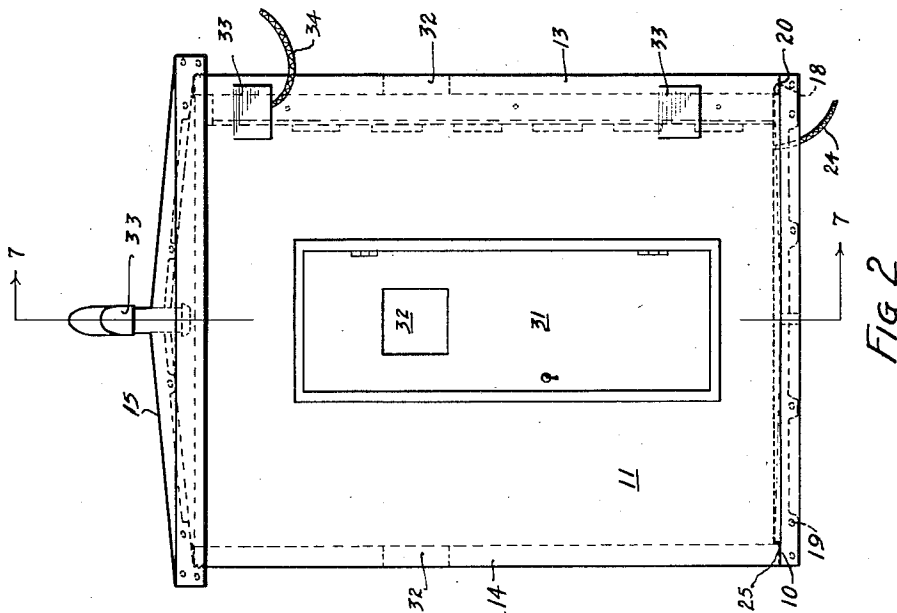
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2,324,326

SECTIONALIZED CONCRETE HOUSE

Filed Oct. 12, 1939

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

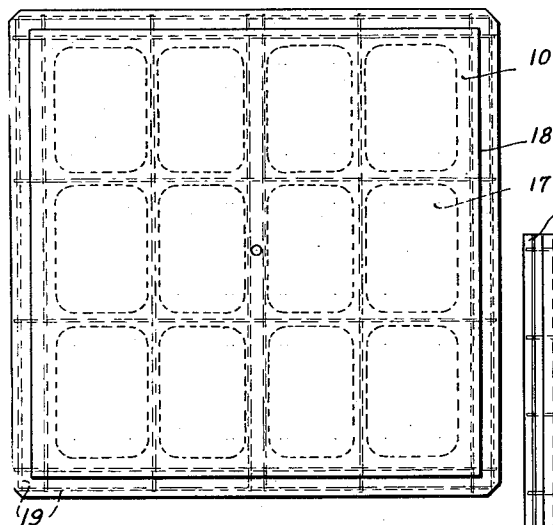


Fig 3

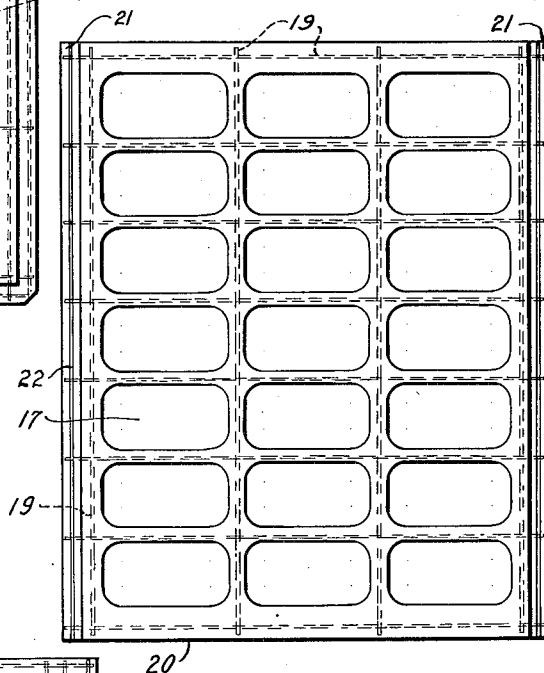


Fig 4

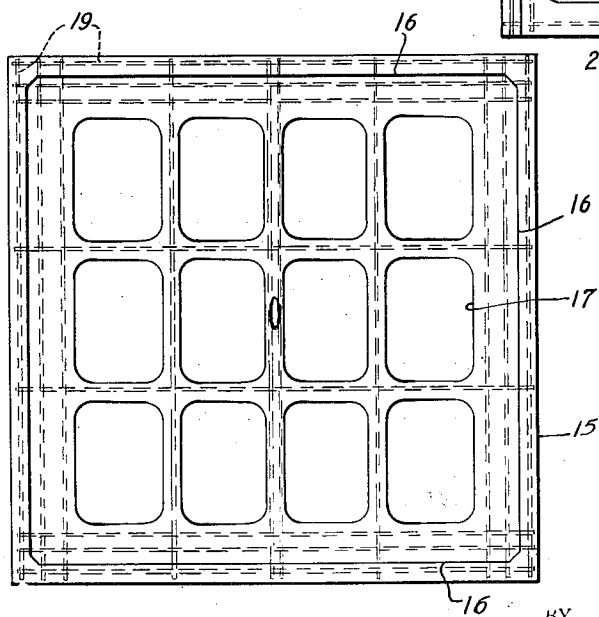


Fig 5

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3 Sheets-Sheet 3

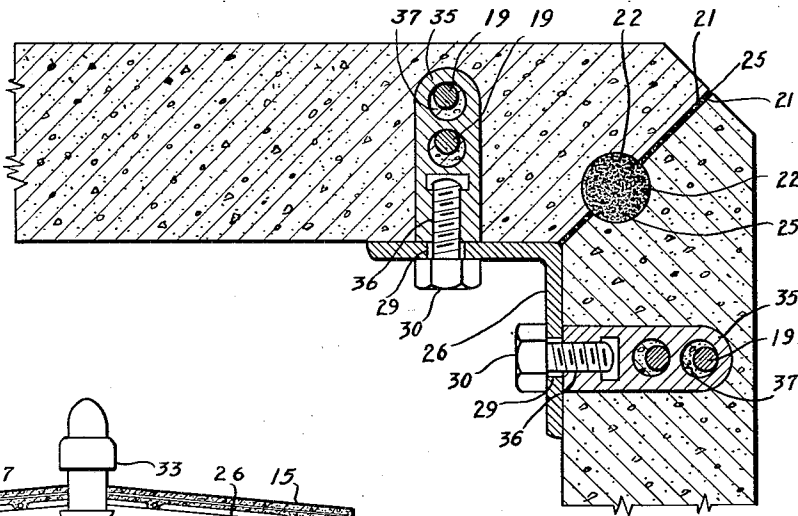


FIG 6.

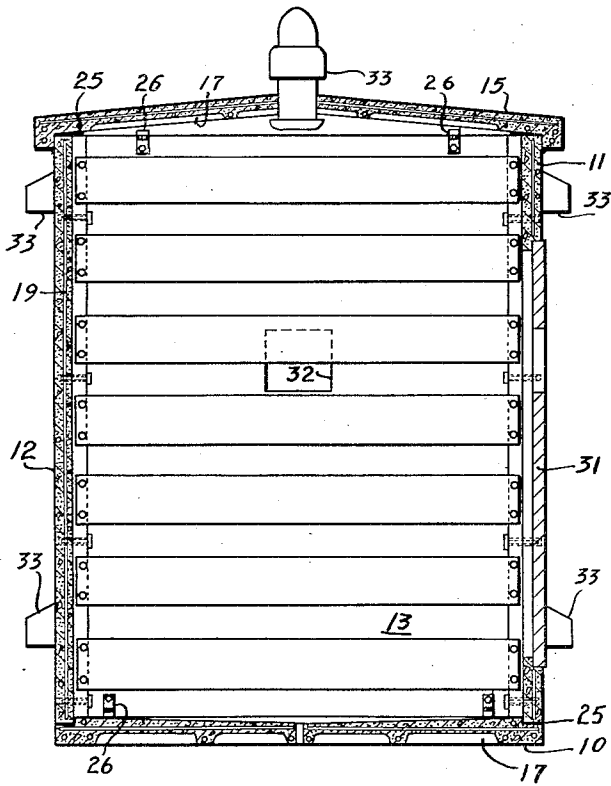


FIG 7

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UNITED STATES PATENT OFFICE

2,324,326

SECTIONALIZED CONCRETE HOUSE

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Application October 12, 1939, Serial No. 299,122

2 Claims. (Cl. 72—1)

My invention relates to concrete houses which are adaptable for housing electrical equipment and more particularly to sectionalized houses made of pre-cast units which may be easily assembled at the location where the house is to be erected.

Prior to my invention three types of houses were used by railroads to protect the electrical equipment and apparatus such as transformers, batteries, rectifiers, terminal blocks, condensers, telephones and relays located along the right-of-way.

Of these three types, wood was the first used but due to the extreme fire hazard and the necessity of frequent painting to keep it from decaying, the railroads turned to sheet iron houses. The sheet iron house obviated the fire hazard but the necessity of frequent painting was still present. The sheet iron corroded quickly and required painting on both the outside and the inside. Further it was very difficult to preserve the floor as it could not be readily painted and it was close to the ground which was apt to be damp.

To obviate the disadvantages of both the wood and the sheet iron houses a monolithic (one piece) concrete house was developed. A reinforced floor was provided which was strong enough to take the place of a foundation and the concrete was fireproof and weather resistant without paint. The monolithic house was very heavy and required complete enveloping forms. In the forms were reinforcing bars. In order that the concrete would flow into place through the complete enveloping form and entirely surround the numerous reinforcing bars it was necessary to use a thin concrete mixture, commonly called "high slump" concrete. A "low slump" concrete could not be used as tamping to settle it would dislocate the reinforcing bars and the structure was too massive to vibrate. The use of the "high slump" concrete caused air pockets and unfilled voids which weakened the walls and in addition produced unsightly exterior and interior discoloration such as blotches. The monolithic cast house was also subject to curing strains and check cracks. A further disadvantage which could not be overcome in monolithic casting was the fact that the concrete was porous and had a high water absorption factor which is very objectionable as it creates a damp interior condition which leads to excessive corrosion and sweating of the apparatus thereby causing signal failures and improper working.

The weight of the wood houses and the sheet

metal houses, which for economy purposes are preferably constructed at a central location, is so great that it requires special steam derrick and work trains to set them in place. A further disadvantage is that they need a foundation which is eliminated with the concrete house. With the sectionalized house it is possible to avoid the expense and delay of special handling as the members may be shipped to the nearest station in less than carload lots, and trucked out to location on the sectionmen's truck car. This not only saves time but considerable expense and delay and makes unnecessary any special handling by work train and steam derrick.

It is, therefore, an object of my invention to construct a house for railway electrical equipment which is not subject to fire hazard and which does not have to be protected by numerous coats of paint or preservative.

A further object of my invention is to construct an equipment house of concrete which is dense and has a low water absorption factor thereby maintaining a dry interior condition which obviates corrosion and sweating of the enclosed apparatus and materially reduces signal failures and improper working.

A further object of my invention is to cast a concrete house in sections or units which may be easily handled thereby eliminating the necessity of a power derrick to erect the house.

Another object of my invention is to use a dry or "low slump" concrete for casting the sectionalized units and to vibrate or tamp the concrete to cause it to flow to all parts of the unit form and to cause the concrete to entirely surround the reinforcing bars.

Still another object of my invention is to provide a house for electrical equipment which is made of a number of assembled units and to so design the units that they are of the maximum practicable size commensurate with the pouring and vibrating of the concrete and the handling of the units.

Another object of my invention is to provide a pre-cast sectionalized electrical equipment house which needs no foundation.

Another object of my invention is to provide a threaded metal insert in the concrete walls of my house and to assure against its pulling out by anchoring it to the reinforcing rods in the walls.

Figure 1 is a side elevation of my invention showing the assembled pre-cast concrete sections erected on the ground.

Figure 2 is a front elevation of my invention

showing the entrance doorway and one method of passing the ingoing parkway cable into the house.

Figure 3 is a plan view of the base or floor unit of the house showing a form of paneling which may be used to reduce the weight of the unit.

Figure 4 is a plan view of the inside of the back wall unit of the house.

Figure 5 is a plan view of the roof or top unit of the house showing the reinforcing bars which permit a lighter-weight construction.

Figure 6 is a large scale section through a joint between two wall sections taken on a line parallel to the floor of the house.

Figure 7 is a vertical section through the house taken along line 7—7 of Figure 2 and looking in the direction of the arrows.

In detail and with reference to the drawings, my invention is a house to enclose the electrical equipment placed along the right-of-way of a railroad.

The method of making the house is to separately cast a base enclosing means 10, a front wall enclosing means 11, a back wall enclosing means 12, a right side wall enclosing means 13, a left side wall enclosing means 14, and a top enclosing means 15 of concrete and then to waterproof the joining edges of the various enclosing means and assemble them into a house.

The process which I employ to reduce the porosity of the concrete to an extent that the infiltration of water into the house no longer is critical is that of vibration.

It is to be seen, therefore, that by sectionalizing the house and vibrating the unset concrete in the sectional forms the porosity can be reduced to the point that moisture infiltration through the pores no longer interferes with the operation of the enclosed electrical equipment.

The base enclosing means 10, the four wall enclosing means 11, 12, 13 and 14 and the top enclosing means 15 are similarly made except that one wall enclosing means has a door and one or more wall enclosing means may have window and ventilator openings. For a more complete description of the details and functions of doors 31, windows 32, ventilators 33 and aerial and parkway cable entrances 34 and 24 reference may be had to my Patent 1,847,272, issued on March 1, 1932, for Concrete housing for electrical equipment.

I shall describe in detail the construction of the base enclosing means 10 and it is to be understood that the process applies to the other enclosing means also. To cast the base enclosing means 10 I first construct a form, preferably of steel, which comprises a bottom and side member. Reinforcing bars 19 are placed in the form at the precise position where strengthening is known to be required by engineering study. A "low slump" or dry cement mixture is next poured into the form and around the reinforcing bars 19 and the entire form, cement mixture, and reinforcing bars are vibrated to cause the "low slump" cement to pack down. This step eliminates all voids and causes the cement to entirely surround all of the reinforcing bars and results in the base means 10 being much less porous when finally cured. A "low slump" cement mixture is used as a "high slump" mixture, when cured, does not have sufficient strength and is subject to porosity, voids, curing strains and check cracks which admit too much moisture into the interior of the equipment houses.

The casting and curing of the sections for my house are preferably done at a central location and the sections shipped to the point along the right-of-way where they are to be erected. Upon arriving at the location the base enclosing means 10 is placed on a level plot of ground. No foundation is necessary as the dense cement, without paint or preservative, is sufficiently water resistant to adequately protect the electrical equipment which is to be enclosed. Continual contact with the damp ground will not materially deteriorate my base enclosing means 10 and periodic freezing and thawing strains are resisted by the reinforcing bars 19 to prevent cracking.

A shoulder 18 has been provided on my base enclosing means 10 which is adapted to be engaged by the lower edges 20 of the wall enclosing means 11, 12, 13 and 14. This shoulder 18 is covered with a waterproofing material 25 before the wall enclosing means are placed on the base enclosing means 10.

The waterproofing material 25 is preferably of a tar base but any material may be used such as the many lead preparations, paint, putty and boat builders calking.

As may be seen in Figure 6 the wall enclosing means 11, 12, 13 and 14 are provided with biased vertical edge surfaces 21. The bias is such that any two wall enclosing means may adjoin each other along the biased surface 21 to form a substantially 90° internal corner in the house, and each of the surfaces 21 has a groove 22 therein. The groove 22 may be of any shape such, for example, as a U or a V but I prefer to use a semi-circle as it can be easily cast into the enclosing means by placing a circular reinforcing bar in the form and then removing the bar from the enclosing means after the cement has set. The purpose of the biased surface 21 and the groove 22 is to provide a waterproof joint between adjoining walls. This may be done by applying the waterproofing material 25 to the surfaces 21 and filling the groove 22 with the waterproofing material 25. It is preferable, though not essential, that the grooves 22 in the biased surfaces 21 complement each other when the wall enclosing means are fastened together thereby forming a large reservoir of waterproofing material 25 which will prevent moisture from seeping through the joints. A similar groove 22 may be provided for both the base enclosing means 10 and the top enclosing means 15 if it is so desired. I do not deem it necessary as the base enclosing means 10 has a shoulder 18 and the top enclosing means 15 is similarly provided.

After the wall enclosing means 11, 12, 13 and 14 are placed on the base enclosing means 10 they are fastened together by attaching members 26. The attaching member 26 is substantially an angle iron having two legs of comparable length. Through each leg there is a screw hole 29. The attaching member 26 is adapted to hold each of the wall enclosing means 11, 12, 13 and 14 to the base enclosing means 10 and to hold adjoining wall enclosing means such as 11 and 13, 11 and 14, 12 and 13, and 12 and 14 together. It may also be used to attach the top enclosing means 15 to any number of wall enclosing means if it is so desired. To effect the attachment the attaching member 26 is placed in the corner between two wall enclosing means which are to be attached together (see Figure 6) and cap screws 30 are placed through the screw holes 29 therein and screwed into threaded metal

inserts 35 which are embedded in the enclosing means.

The threaded metal inserts 35 are embedded in the enclosing means at the time that the enclosing means are cast. Each threaded metal insert 35 is provided with a threaded female means 36 adapted to receive the cap screw 30 and with attaching holes 37 adapted to receive the reinforcing bars 19. The attaching holes 37 are designed to assure that the threaded metal inserts 35 do not pull out from the enclosing means as they might do if merely embedded in the concrete. When the enclosing means are cast the reinforcing bars 19 are passed through the attaching holes 37 in the threaded metal insert 35 and the threaded metal insert is accurately placed in a position that assures alignment between the screw hole 29 in the attaching member 26 and the threaded female means 36 in the threaded metal insert 35 thereby assuring that the cap screw 30 will engage them both.

Several methods may be used to attach top enclosing means 15 to the wall enclosing means. The method illustrated is to provide the top enclosing means 15 with a shoulder means 16 adapted to engage the wall enclosing means and prevent them from spreading away from each other. Other methods may include gravity and the heretofore described attaching members 26. Waterproofing material 25 is placed between the wall enclosing means and the top enclosing means to prevent water from entering the house.

To reduce the weight of the enclosing means I provide relieved paneling 17 in the base, wall and top enclosing means as can be seen in Figures 3, 4, and 5. The panels may be in the neighborhood of one and one-half inches in depth and extend into the enclosing means between the reinforcing bars 19. It is possible by this arrangement to materially reduce the weight of each enclosing means without materially affecting the strength. In Figures 1, 2, and 7 I show unpanelled wall enclosing means. It is to be understood, however, that the base and top enclosing means may also be unpanelled if it is so desired.

Lightness of weight is an important element in the construction of these houses as it was necessary with the monolithic concrete houses to use a work train with a power derrick to transport and erect the house. With my new sectionalized house it is possible for a construction gang to transport the sections on a work truck and erect them by using a relatively small manually operated hoist.

Summarizing, my invention is an improvement over wood, sheet iron and monolithic concrete houses and more particularly over the monolithic house as it prevents moisture from seeping through the walls and floor. In the monolithic construction painting with a waterproof paint

was tried but even though both the interior and exterior surfaces were covered moisture still affected the operation of the enclosed equipment.

I have described my invention as being fastened together by angle irons and cap screws threaded into metal inserts cast in the concrete enclosing means and tied to the reinforcing rods. It is to be understood, however, that the well known method of attaching the enclosing means together by thru bolts or their equivalent is contemplated in this application.

I have described the corners between the enclosing means as having biased edge surfaces such as is illustrated at point 21. It is within the purview of this application that other methods of joining corners shall be included. Other methods may include butt joints, mitre joints, and angularly and arcuately disposed mating surfaces, with or without a calking compound reservoir 22. Further, my joint may have zig-zagged mating surfaces; that is to say, it can start at one wall surface and progress to the other side in any number of directions and the distances between changes of directions may be the same or varied. It is also within the purview of this application that the corner between enclosing means may be curved and may be provided with a calking compound reservoir 22.

Although I have described my invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

I claim as my invention:

1. A house for electrical equipment comprising, in combination, pre-cast concrete base enclosing means, pre-cast concrete wall enclosing means, said concrete enclosing means being made of "low slump" concrete and vibrated to produce a dense concrete which materially avoids the absorption of water and reduces the dampness upon the electrical equipment, means for securing the concrete enclosing means together, and top enclosing means for enclosing the concrete enclosing means.

2. A house for electrical equipment comprising, in combination, pre-cast concrete base enclosing means, pre-cast concrete wall enclosing means, said concrete enclosing means being made of "low slump" concrete and vibrated to produce a dense concrete which materially avoids the absorption of water and reduces the dampness upon the electrical equipment, means for securing and sealing the concrete enclosure means together, and top enclosing means for enclosing the concrete enclosing means.

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