T. A. EDISON.

APPARATUS FOR THE PRODUCTION OF CONCRETE STRUCTURES.

APPLICATION FILED JAN. 18, 1917.

1,326,854. Patented Dec. 30, 1919.

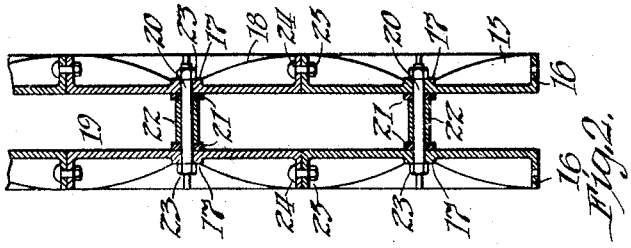

Fig. 2.

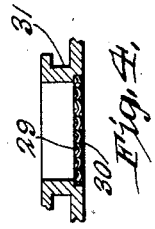

Fig. 4.

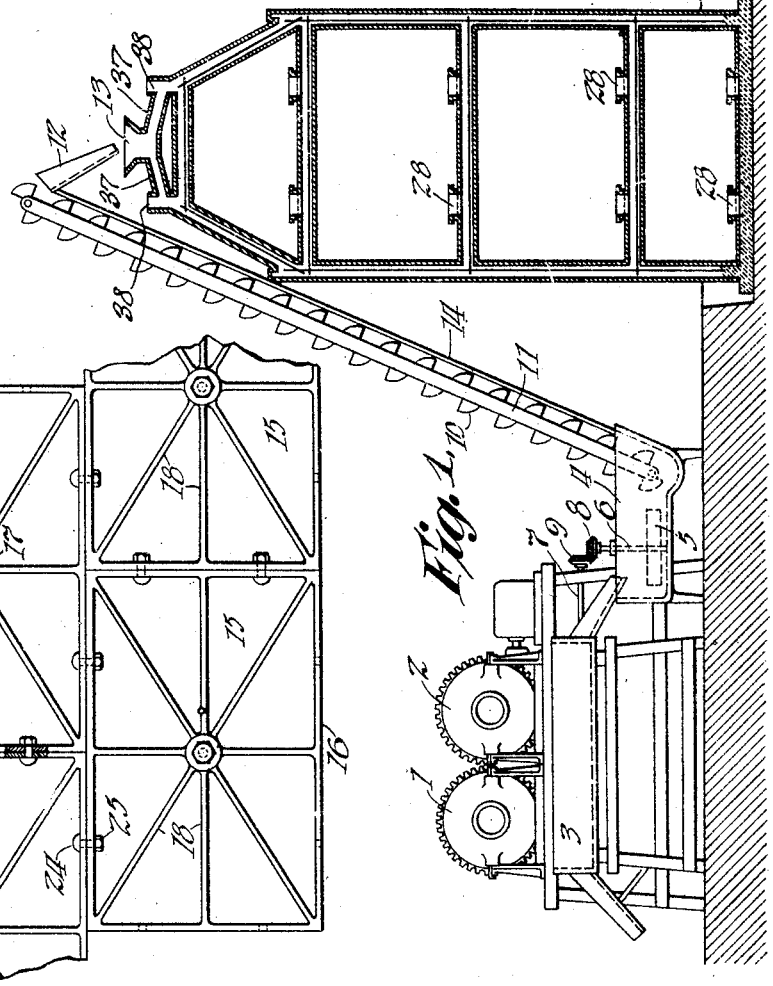

Fig. 1.

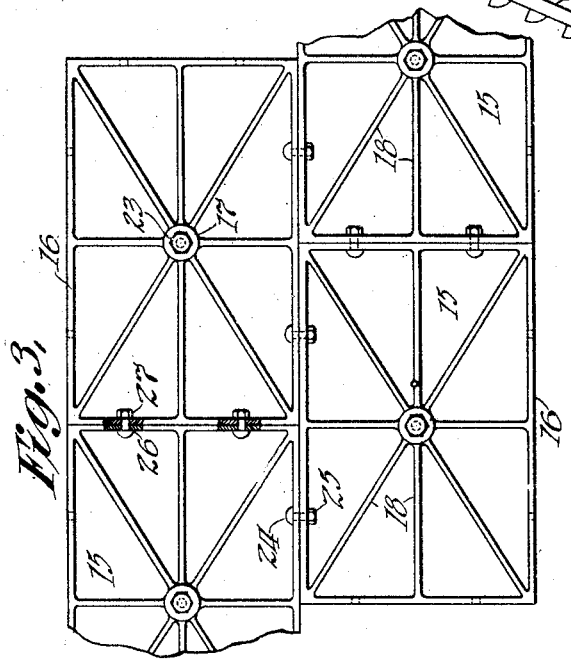

Fig. 3.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE PRODUCTION OF CONCRETE STRUCTURES.

1,326,854. Specification of Letters Patent. Patented Dec. 30, 1919.

Original application filed August 13, 1908, Serial No. 448,293. Patent No. 1,219,272, dated March 13, 1917. Divided and this application filed January 18, 1917. Serial No. 143,018.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Apparatus for the Production of Concrete Structures, of which the following is a description.

This application is a division of my application Serial No. 448,293, filed August 13, 1908, and entitled Process of constructing concrete buildings, on which Patent No. 1,219,272 was granted March 13, 1917.

My invention relates to the production of concrete structures, and more especially to an improved apparatus for facilitating the construction of such structures. The principal object of my invention is to provide an apparatus including an improved form of mold, preferably adapted to be employed to form all parts of a building, including the sides, roofs, partitions, floors, bath tubs, etc., of an integral mass of a cement mixture preferably by a single molding operation, and preferably by the process described and claimed in my application referred to above. This invention is adapted to be used in constructing buildings of any sort, but I contemplate its use particularly for the construction of dwellings, in which the stairs, mantels, ornamental ceilings and other interior decorations and fixtures may all be formed in the same molding operation and integral with the house itself.

In the production of such a building, I first preferably construct a complete double wall house, which forms a mold for the reception of the cement mixture. This mold is preferably constructed of cast iron sections removably connected together in any suitable manner, as by means of bolts, dowels, etc., and adapted when the house is constructed and the cement mixture is hardened, to be taken to pieces and removed and used repeatedly for the construction of an indefinite number of houses. When the mold has been constructed and erected, I connect a number of distributing pipes therewith, which are preferably arranged at regular intervals at the top of the mold, the said pipes being connected to a common source of supply, which may conveniently consist of a vertical riser having a funnel-shaped opening for the reception of the cement mixture. Means such as hereinafter described is also provided for continuously raising Portland cement mixture from a point adjacent to the mold to the top of the mold and pouring it into the riser thereon, whence it flows around the top of the mold and is distributed evenly throughout the same.

Other objects and features of my invention will be hereinafter more fully described and claimed.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which:

Figure 1 is a view in side elevation, partly in section, showing an erected mold, with all the removable sections connected together, and the means for mixing concrete and lifting the same to the top of the mold and pouring the same therein;

Fig. 2 is a vertical cross section and Fig. 3 is a side elevation of several of the mold sections, showing the preferred method of spacing and connecting the same; and

Fig. 4 is a detail showing one of the air vents provided at various points in the mold to guard against the trapping of air while preventing the escape of the cement mixture.

The same reference characters are used throughout the various figures to refer to corresponding parts.

I preferably use for the molding operation a cement mixture formed of crushed stone, quartz or similar materials having particles varying from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, say five parts; ordinary sand, say three parts; and Portland cement, say one part; although these proportions may be considerably varied. Enough water is used to form an emulsion having sufficient fluidity to flow readily to all parts of the mold. During the setting of the mixture the water enters into chemical combination in the usual way, and if any surplus water is present it will appear as a mere dampness, which quickly dries out. In order to prevent settling of the crushed material during the molding operation and before setting commences and the resulting objectionable segregation of the ingredients, I find that by adding a comparatively small amount of fine clay to the mixture, say twenty per cent. of the cement used, the tendency to settling

is greatly diminished, while at the same time the amount of water used is sufficient to give a high degree of fluidity to the emulsion and permit very successful molding.

As shown in Fig. 1, the concrete is mixed in mixers 1 and 2. The mixture is poured out of either mixer into a tank 3, where it is tested. If it is found to be a correct mixture, it is allowed to flow into agitator tank 4; otherwise it is poured on the ground. Agitator 5 is constantly rotated by means of shafts 6 and 7, carrying intermeshing gears 8 and 9, shaft 7 being rotated from a source of power. The well mixed concrete in tank 4 is elevated by means of buckets 10 of an endless bucket conveyer 11 to the top of the mold, where it is poured through funnel 12 into the vertical riser 13 of the mold. The conveyer is guarded by a shield 14.

Referring particularly to Figs. 2 and 3, the mold is preferably made of sections in the form of castings, as 15, 15, having flanges 16, 16. These castings are formed with bosses 17, 17, from which radiate ribs 18. The mold walls are held together and spaced apart such a distance as to form a wall of the requisite thickness in the space 19 between them by means of bolts 20, carrying wooden washers 21 on the inside of the mold walls and concrete sleeves 22 between the washers. The bolts may be drawn up tightly and secured by nuts 23 on the outside of the bosses. The mold sections are held together by means of the bolts 24 extending through the horizontal flanges carrying nuts 25 and by bolts 26 through the vertical flanges, bolts 26 carrying nuts 27. The mold sections are preferably arranged in staggered relation, as shown in Fig. 3. To guard against the trapping of air and consequent imperfection of the molded cement mixture when the structure is finished, I provide at various points in the mold where air is liable to trap, as for example, in the floors and partitions and wherever the mixture has to flow through tortuous channels, a number of air vents 28 which will allow the escape of the air but will prevent the escape of the mixture. One way in which I may construct such air vents is illustrated in Fig. 4, and consists in making flange openings in the mold sections, which are closed by an outer screen, preferably of coarse wire mesh, 29, and by an inner lining of filter cloth, 30. These vents, as shown, are formed with protecting flanges 31.

Troughs or pipes 37 and 38 lead from the vertical riser 13 to various points at the top of the mold. In forming a house by my improved mold, the cement mixture is preferably continuously poured into the vertical riser 13, and flows therefrom through the troughs or pipes 37 and 38, whence it is distributed evenly through the various parts of the mold, thus preventing segregation of the components of the mixture. The pouring is preferably continued until the whole mold, forming the complete double-wall house, is filled to the highest point and the mixture has risen part way up into riser 13. After the mixture has stood for a sufficient length of time for perfect hardening, the mold sections may be removed by unscrewing the various nuts 23, 25, 27, etc., and removing the bolts 24 and 26 and also washers 21. The concrete sleeves 22, which serve to space the mold walls apart the proper distance, have now become merged in the integral structure of the wall of the building. The holes left by the removal of the bolts 20 and washers 21 may now be filled by the insertion of a sufficient quantity of cement mixture.

Having now described my invention, what I claim and desire to protect by Letters Patent is as follows:—

1. A mold structure for a hollow concrete structure adapted to completely form such concrete structure on the pouring of cement mixture thereinto, comprising sections removably connected together and provided with means below the point of introduction of the cement mixture thereinto for permitting the egress of air from the mold structure into the interior of the latter, while retaining the cement mixture in place in the mold structure, substantially as described.

2. In apparatus for constructing a hollow concrete structure having vertical walls and horizontal portions extending substantially across and within the same, a mold structure which is adapted to completely form such concrete structure on the pouring of cement mixture thereinto, said mold structure comprising sections removably connected together and having means provided in upper portions of horizontal sections thereof and below the point of introduction of the cement mixture into the mold structure for permitting the passage of air into the interior of the mold structure while retaining the cement mixture in place in the latter, substantially as described.

3. In apparatus for constructing a concrete building having vertical walls and a floor or floors, a mold structure which is adapted to completely form such concrete building on the pouring of cement mixture thereinto, said mold structure comprising sections removably connected together, being open for the introduction of cement mixture only at the top, but having an opening or openings for the egress of air at another level or other levels, substantially as described.

4. In apparatus for constructing in a single operation a concrete building having one or more apartments, a mold structure which is adapted to completely form such

building on the pouring of cement mixture thereinto, said mold structure comprising sections removably connected together and provided with means for permitting air to escape therefrom into an apartment when the cement mixture is introduced into the top of the mold structure while retaining the cement mixture in place in the latter, substantially as described.

5. In apparatus of the class described, a mold structure comprising sections removably connected together and forming a complete double-wall house or building having a plurality of superposed apartments, all portions of said mold structure being intercommunicating, and said mold structure being open for the introduction of cement mixture only at the top, substantially as described.

6. In apparatus of the class described, a mold structure comprising sections removably secured together and forming a complete double-wall house comprising a plurality of apartments, said mold structure being open for the introduction of cement mixture only at the top, and means for continuously introducing cement mixture into the opening in the top of said mold structure until the latter is completely filled, substantially as described.

7. A mold structure for an integral homogeneous concrete structure which is adapted to completely form such concrete structure on the pouring of cement mixture thereinto, said mold structure being provided with a vent device below the point of introduction of the cement mixture thereinto, said device permitting the egress of air and being provided with means which prevents deformation of the contour of the molded concrete structure, substantially as described.

8. A vent device for a concrete mold, comprising a filter cloth and a wire screen coacting with said cloth, substantially as described.

9. A vent device for a concrete mold, comprising an outer screen of coarse wire mesh and an inner lining of filter cloth, substantially as described.

This specification signed and witnessed this 16th day of January, 1917.

THOS. A. EDISON.

Witnesses:
WILLIAM A. HARDY,
FREDERICK BACHMANN.