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Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING CONCRETE BLOCKS.

1,061,117.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed August 13, 1908. Serial No. 448,397.

To all whom it may concern:

Be it known that we, ARON B. PINNEY and OVID L. PINNEY, of Arlington, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Forming Concrete Blocks; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention contemplates an improved apparatus for treating the constituent elements of composition articles, such as concrete blocks or slabs, with the object of forming them of maximum density.

It is well known in this art that the highest efficiency of cement as a binder is attained by the use of a certain quantity of water. The cement assumes a plastic condition when first mixed with the water and other elements and upon hardening it exerts its tenacious effect to maintain the compound. Blocks made by a "wet" process, that is those resulting from a saturated compound are a desideratum and are the purpose of extensive tests and experiments. In the manufacture of concrete blocks by the methods heretofore practised, however, it has not been feasible to employ enough water to attain the full efficiency of the cement, for the reason that the cement when wet adheres so strongly to the molds that the latter cannot be removed without destroying the block. Various attempts have been made to overcome this tendency of the wet cement but so far as we are aware none of them has succeeded. Consequently it is necessary to limit the water in order to enable the mold to be removed and it is a well known fact that the quantity of water is not as great as it should be, and hence the methods in general use are known as "dry" processes. We have discovered that the reason the proper amount of water cannot be used is because when the method of treating the compound is by tamping or ramming it, or subjecting it to pressure, the highest degree of density in the compound is not developed. In performing our process we dispense entirely with the tamping and pressing and

effect the coalescence of the constituents by an improved machine which subjects the compound to a vibrating or shaking action. The agitation causes the constituents to thoroughly intermingle and settle of their own accord. The block thus formed is of uniform density.

In the accompanying drawing Figure 1 is a side elevation and Fig. 2 is an end view of mechanism embodying our invention. Fig. 3 is a detail.

We have shown a frame or casing 1 suitably mounted and having a pair of oppositely disposed horizontal side bars 2, preferably of channel iron. A pair of cross heads 3 are shown supported by the channel bars, the heads being mounted as shown in Fig. 3. The heads are connected together by straps 4 and are free to slide or reciprocate upon the channel bars. The mold 5 and its subjacent pallet 5^a are removably mounted upon the cross heads 3 beneath a hopper 5^b. We have shown in Fig. 1 a plate 6 pivoted to one of the cross heads and secured to the other, a stirrup 7 carried by the plate engaging a lug 8 on the mold 5. In Fig. 3 is illustrated the manner of binding the mold to the cross heads. A spring 9 tends to hold the plate elevated while a lever 10 fulcrumed on the cross head bears against the plate and carries a pawl 12 engaging ratchet teeth on the cross head. By bearing down on the lever the plate 6, through the stirrups 7, binds the mold to the cross heads. When the stirrup is turned into the position shown in dotted lines, Fig. 1, the mold may be removed from the cross heads. The reciprocating motion may be imparted to the cross heads by means of a lever 13 and a connecting rod 14. This lever is designed to be connected to a crank forming part of an engine, and, as shown in Fig. 2, one of its arms is secured to the bridge portion of a U-shaped casting 15 having trunnions 16 journaled in the frame, or the part 15 may be integral with the lever, that is, the lever may be formed with a right angular bifurcated portion mounted to swing in the frame as described.

17 designates a slide movable vertically in the U-shaped part 15 and supported by a

fall 18 wound upon a drum 19 on a shaft 20 having a hand wheel 21. This slide forms the point of connection between the connecting rod 14 and the lever 13, as shown in Fig. 1, and as the slide is movable toward and away from the pivots 16 so the motion imparted to the connecting rod and the consequent reciprocation of the cross heads 3 may be lessened or increased. In Fig. 2 the slide is shown in alinement with the pivots 16. When in this position the swing of the lever 13 and part 15 will have no effect upon the connecting rod 14 and the mold carriage, as cross heads 3 may be termed. Hence in operation when the vibrating action of the mold commences the operator may turn the wheel 21 and gradually elevate the slide 17 and reduce the vibration until it is in the position shown in Fig. 2 when the vibrating action will stop. The plate 6 and stirrups 10 being then released the mold and its contained block and the pallet 5^a may be removed and another mold inserted and supplied with materials through the hopper 5^b. Thus it is not necessary to stop the engine in order to replace a mold. The action usually begins with a strong vibration which is gradually lessened while the mold is forming.

One great advantage resulting from our invention is that the mold may be lifted off the block without disturbing the surface of the latter, owing to the complete coalescence of the ingredients. This has been demonstrated by actual tests. The necessary manner of removing the mold in the dry process is by separating its sides from the other parts and removing them laterally. This mode would of course be necessary in removing any mold from the ornamented face of the block, but we may ornament the bottom face of the block, that is, the face resting on the pallet, and the plain sides of the block are not affected by lifting the mold.

We have subjected a concrete block made by the ordinary dry process to our vibrating action and found its volume reduced 64 cubic inches. The average rate of production of the dry processes is about ten blocks per hour. By our method ten blocks may be molded in eight minutes.

To those skilled in the art the advantages of our invention will be apparent from the fact that the materials we use are of about the consistency of "hard mortar" since this is known to contain much more water than the "dry process" concrete block. Manifestly the reason for being able to attain this consistency is that the vibration causes the materials to settle and the angular faces of the sand and other particles to assume such relative positions that the density of the mass is greater than can be attained by the methods heretofore practised and hence the mold may be lifted from the block without

defacing it. Our machine would form a dense block even if the quantity of water were greatly in excess of the requirements, but since too much water would only tend to carry off the alkali of the cement without aiding the composition the amount we suggest by comparison to hard mortar will be found to result in the thorough action of the cement.

We claim as our invention:

1. In an apparatus for forming concrete blocks by a constant reciprocation of the materials in a horizontal plane, a frame having a horizontally disposed track, a carrier movable on said track, means for maintaining said carrier in a constant horizontal plane during its movement, a mold fixedly secured to said carrier, and means for constantly reciprocating said carrier during each molding operation.

2. In an apparatus for forming concrete blocks by a constant reciprocation of the materials in a horizontal plane, a frame having a horizontally disposed track, a carrier movable on said track, means for maintaining said carrier in a constant horizontal plane during its movement, a mold fixedly secured to said carrier, means for reciprocating said carrier, and means for regulating the amplitude of the reciprocations.

3. In an apparatus for forming concrete blocks by a constant reciprocation of the materials in a horizontal plane, the combination with the frame, the horizontally disposed way or track mounted therein, the mold carrier movable on said track, and means for securing a mold to said carrier, of a lever fulcrumed on said frame and adapted to have one of its arms connected to an engine shaft, a rod secured to said carrier, and means for attaching said rod to the other arm of said lever, said means being capable of gradual adjustment with relation to the fulcrum of said lever while the apparatus is in operation, whereby the reciprocation of said carrier may be regulated during the formation of the composition articles.

4. Apparatus for forming composition blocks comprising a frame having a horizontally disposed way or track, a carrier movable thereon, means for maintaining said carrier in a constant plane, a mold secured to said carrier, a lever having a U-shaped portion pivoted in said frame, means for rocking said lever, a slide movable in said U-shaped portion, and a rod secured to said slide and to said carrier.

5. Apparatus for forming composition blocks comprising a frame having parallel, horizontally disposed guides, cross heads movably mounted on said guides, a plate pivoted to one of said cross heads, a spring tending to hold the free end of said plate

to the other cross head, a stirrup pivoted to
said plate, a mold carried upon said cross
heads and having a lug engaged by said stir-
rup, and adjusting means acting against
5 the tension of said spring for binding said
mold to said cross heads.

In testimony whereof, we have signed this

specification in the presence of two subscri-
ing witnesses.

ARON B. PINNEY.
OVID L. PINNEY.

Witnesses:

JOHN M. BENSON,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents
Washington, D. C."