July 14, 1931. G. S. HOUSMAN 1,814,159

APPARATUS FOR MOLDING BRICKS

Filed Sept. 15, 1928

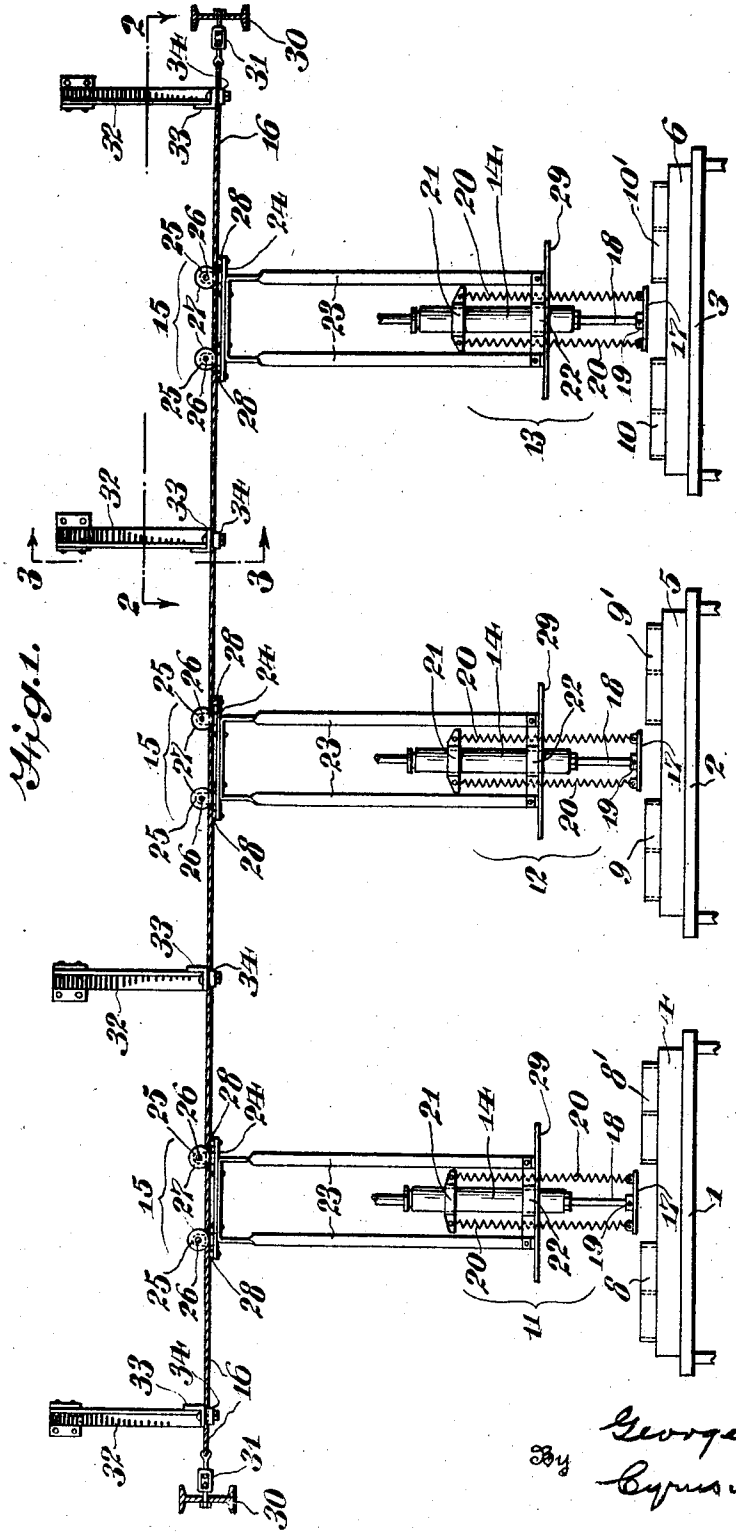


Fig. 1.

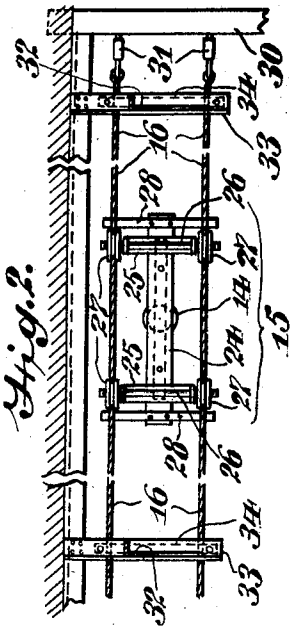


Fig. 2.

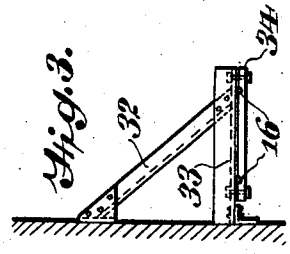


Fig. 3.

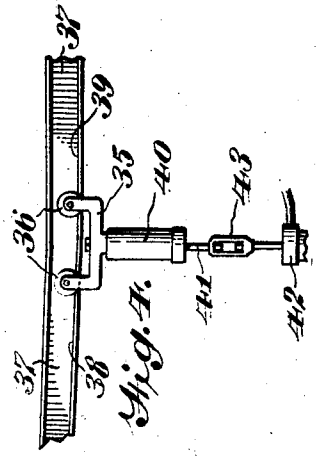


Fig. 4.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR MOLDING BRICKS

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My invention relates to methods and apparatus for molding bricks, and while capable of being employed for the molding of various kinds of bricks and other objects it is particularly well adapted for molding silica, magnesite, and other refractory bricks.

It is a general object of my invention to provide a novel method of molding bricks by the practice of which bricks of refractory or other material may be so molded as to produce uniform density thereof with the expenditure of a minimum amount of labor and without the employment of expensive or complicated machinery.

It also is a general object of my invention to provide novel apparatus by means of which the method of my invention may be practiced, which apparatus is of simple construction and highly efficient in use.

Another object of my invention is to provide a novel procedure wherein a mass of moldable material is subjected to the action of a mechanical hammer which is or may be driven by compressed fluids, electricity, or other means for tamping the said mass into a mold to form bricks of various shapes or other objects of uniform density.

A further object of my invention is to provide novel apparatus of the character indicated, which includes a simple and efficient construction of means whereby the employment of mechanical hammers which are or may be driven by compressed fluids, electricity, or other means, for tamping a refractory or other moldable material in molds, may be made practical and convenient, the said means being constructed and arranged to afford adequate recoil or rebound of the hammers to produce bricks of uniform density.

A still further object of my invention is to provide a novel method and apparatus wherein and whereby each of the mechanical hammers is suspended in such manner that the proper rebound of the same is permitted during the operation thereof, and at the same time the use of each of the said hammers by two or more workmen or operatives is permitted.

Another object of my invention is to provide novel apparatus for tamping moldable materials in molds, which includes a mechanical hammer provided with a tamping head or plate of novel construction.

Other objects and advantages of the invention will be pointed out in the description thereof which follows or will become apparent from such description.

In order that the invention may be readily understood and its manifold practical advantages appreciated, reference should be had to the accompanying drawings in which is illustrated apparatus which is or may be employed in the carrying out of the novel method of my invention. But it should be understood that the apparatus of my invention is susceptible of being embodied in other forms of construction than that shown and that changes in the details thereof and in the mode of procedure outlined herein may be made without departing from the principle of the invention.

In the drawings:

Fig. 1 is a view in front elevation of novel apparatus invented by me by which the novel method of my invention may be practiced;

Fig. 2 is a view in top plan of a fragmentary portion of the apparatus illustrated in Fig. 1, the said view being taken on the line 2—2 of Fig. 1;

Fig. 3 is a view in side elevation of one of the hangers or supports which serve to support the apparatus illustrated in Fig. 1, the said view being taken on the line 3—3 of Fig. 1; and

Fig. 4 is a view in front elevation of a fragmentary portion of apparatus embodying a modified form of the apparatus illustrated in Fig. 1.

In Fig. 1 of the drawings I have shown work tables 1, 2 and 3, upon which are placed blocks 4, 5 and 6 which preferably consist of wood. These blocks are adapted to support respectively the molds 8 and 8′, 9 and 9′, and 10 and 10′, or additional molds, which molds are of known construction. The said blocks are or may be interchangeable with other blocks of different thickness for varying the height of the said molds. Hammer assemblies or units 11, 12 and 13 are sup-

ported respectively above the tables 1, 2 and 3. These assemblies or units are or may be identical in construction, and a description of one of them will suffice for all. The assembly 13, for example, comprises a mechanical or power driven hammer 14 which may be driven by compressed air, steam, or other fluid, by vacuum, or by electricity. The said hammer is mounted in a carriage or trolley designated generally at 15 which is supported by and adapted to travel along the cables 16. These cables which preferably consist of stranded wire, constitute resilient supporting means for all of the said carriages, and the movable carriage 15, for example, enables the hammer 14 to be brought into operative relation with either of the molds 10 or 10' or additional molds which may be placed on the block 6. The said hammer is provided with a tamping head or plate 17 pivotally connected to the bottom end of the plunger 18 of the hammer, as shown at 19. This pivotal connection of the tamping head to the plunger permits automatic adjustment of the said head about an axis which extends transversely of the said molds. As a result of this construction, the said tamping head adapts itself to the surface of the mass of moldable material in either of the said molds during the operation of the hammer. The said tamping head or plate is normally yieldingly retained in horizontal position by means of a pair of tension springs 20, the lower ends of which are connected thereto near the ends thereof on opposite sides of the pivotal connection referred to already. The upper ends of the said springs are connected to the ends of the cross head 21 which is clamped to the body portion of the said hammer.

The carriage or trolley may be constructed in any suitable manner but preferably of metal. In the construction illustrated in Figs. 1 and 2 the hammer 14 is clamped between a pair of strips one of which is shown at 22, the central portions of which strips are bowed to fit the cylindrical surface of the body portion of the said hammer. These strips are connected at their opposite ends to the opposite sides of the bottom ends of the vertical supports 23 secured in fixed parallel relation to each other to the longitudinally extending member 24. The said supports may be formed from a single bar of metal bent into U-shape, as shown. The member 24 is connected to and supported by the transversely extending members 25 in which are journaled the shafts 26 upon the ends of which shafts sheaves 27 are mounted. These sheaves engage the cables 16, thereby permitting the carriage or trolley and the hammer supported thereby to be moved longitudinally with respect to the work table 3 in either direction. It should be understood that the carriage may be so constructed as to enable the same to be supported by a single cable, and that the use of a single cable comes within the principle of my invention.

The ends of the member 24 project beyond the member 25 and transversely extending bars 28 are secured to said ends. The ends of the bars 28 extend underneath the cables 16 and constitute stops for limiting the upward movement of the carriage or trolley during the operation of the hammer which is supported thereby.

If desired, a shield 29 consisting of a flat sheet of metal may be secured to the bottom portion of the carriage or trolley to prevent particles of moldable material from coming into contact with the person of the operative or attendant. But I do not regard the provision of such a shield as an essential feature of the construction.

The ends of the cables 16 are connected to rigid members such as I-beams 30 by means of turn buckles 31. The said turn buckles are for the purpose of adjusting the tension of the said cables to the desired degree. The said cables also are preferably supported at intervals by hangers or supports 32 which are secured to the wall of the building in which the apparatus is located or to any other suitable rigid support. The cables are secured to the bottom sides of the cross arm 33 of the hangers by means of clamping strips 34 bolted to the said cross arms, as shown for example in Fig. 3. By supporting the cables at intervals as described, the said cables are thereby divided into a plurality of pairs of sections, which pairs may vibrate independently of each other. As a result of this construction the operation of one of the hammers does not interfere with nor affect the operation of the others.

It is to be understood that any number of hammer assemblies or units and sets of molds therefor may be provided as desired. sired.

Before beginning the operation of the apparatus which has been described, the cables 16 should be adjusted in such manner as to permit desired or required deflections of the pairs of sections thereof during the operation of the hammers. When so adjusted the hammers are permitted to rebound or vibrate in vertical directions. As described already, two or more molds are or may be supported by the exchangeable blocks 4, 5 and 6, which blocks are so selected as to thickness that the top edges of the molds will be spaced at the proper distance from the bottom side of the tamping head or plate 17. But it will be obvious that the same result may be obtained by varying the position of the hammer relative to the molds. After the above adjustments have been effected the apparatus will be in condition for operation.

One of the essential features of my invention is that each of the hammers may be employed by two or more operatives. For

example, moldable material is delivered to, say, mold 8 by one operative who prepares the same for tamping. When the material is ready to be tamped the hammer assembly 11 is caused to travel to the left by the said operative to the proper position, whereupon the said hammer is operated to tamp the material in the mold. By the time the first operative has completely tamped the said material in the mold and has caused the hammer assembly to return to its normal position, a second operative will have prepared moldable material in the mold 8′ for tamping, whereupon he will move the said assembly toward the right into operative relation to the mold 8′ and will tamp the material therein. These operations may be continued in cycles indefinitely by two or more operatives, one of the operatives preparing one of the molds for tamping while the other of the said operatives is tamping the material in the mold prepared by him, and so on.

The hammer assemblies or units tend to return to normal central position because of the sag which is or may be present in the cables which support the same. This sag in the cables is hardly appreciable and therefore it is not shown in the drawings.

In Fig. 4 I have shown a modified form of hammer assembly wherein the carriage 35 is provided with two pairs of rollers, one pair of which is shown at 36, the other pair being located on the other side of the I-beam 37 and therefore is not seen. These rollers engage the top sides of the bottom flanges of the said I-beam 37. The I-beam 37 is bent as shown to provide portions 38 and 39 which are slightly inclined toward each other. Other similar bends in the beam will or may be provided at intervals therein. A barrel or casing 40 adapted to confine resilient mechanism, such as a dash pot, springs, or the like, is connected to the said carriage. The plunger 41 which projects through the bottom of the said barrel or casing and the top end of which is secured to the resilient mechanism confined in the said casing, is adapted to support the hammer 42, the said hammer being connected to the bottom end of the plunger by means of a turn buckle 43. This turn buckle enables the hammer to be adjusted upwardly or downwardly. This modified form of hammer assembly may be employed in multiple in substantially the same manner as the assemblies or units illustrated in Fig. 1 and in lieu thereof, the resilient mechanism which is confined in casing 40 being adapted to permit rebounding or vibrating action of the hammer supported thereby during the operation of the said hammer, and the inclined portions of the I-beam in each case tending to cause the said hammer to automatically return to normal position.

It will be seen that by my invention as hereinbefore described I am enabled to produce bricks of uniform density in large quantities at low cost.

The word "brick", as used herein, is not intended to limit the invention to the molding of bricks of conventional shape and dimensions, but applies to bricks of special shape and to other objects which may be molded from plastic, semiplastic, or other material capable of being molded.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In apparatus for molding bricks, the combination with a plurality of molds of a power driven hammer for tamping moldable material in the said molds, the said hammer having a tamping head pivotally connected thereto, means for supporting said hammer, said means and the said hammer being adapted to be positioned in operative relation to any one of the said molds, and elastic yielding means having connection with said head at points on opposite sides of the axis of its pivotal movement, the said elastic yielding means exerting an upward pull upon said head.

2. In apparatus for molding bricks, the combination with a mold of a power driven hammer for tamping a mass of moldable material in the said mold, a tamping head, a pivot for pivotally connecting said head to said hammer, said pivot extending transversely of the axis of said hammer, and yielding elastic means having connection with said head and tending to hold the same in a plane extending substantially at right angles to said axis.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 14th day of September, A. D. 1928.

GEORGE SCOTT HOUSMAN.