

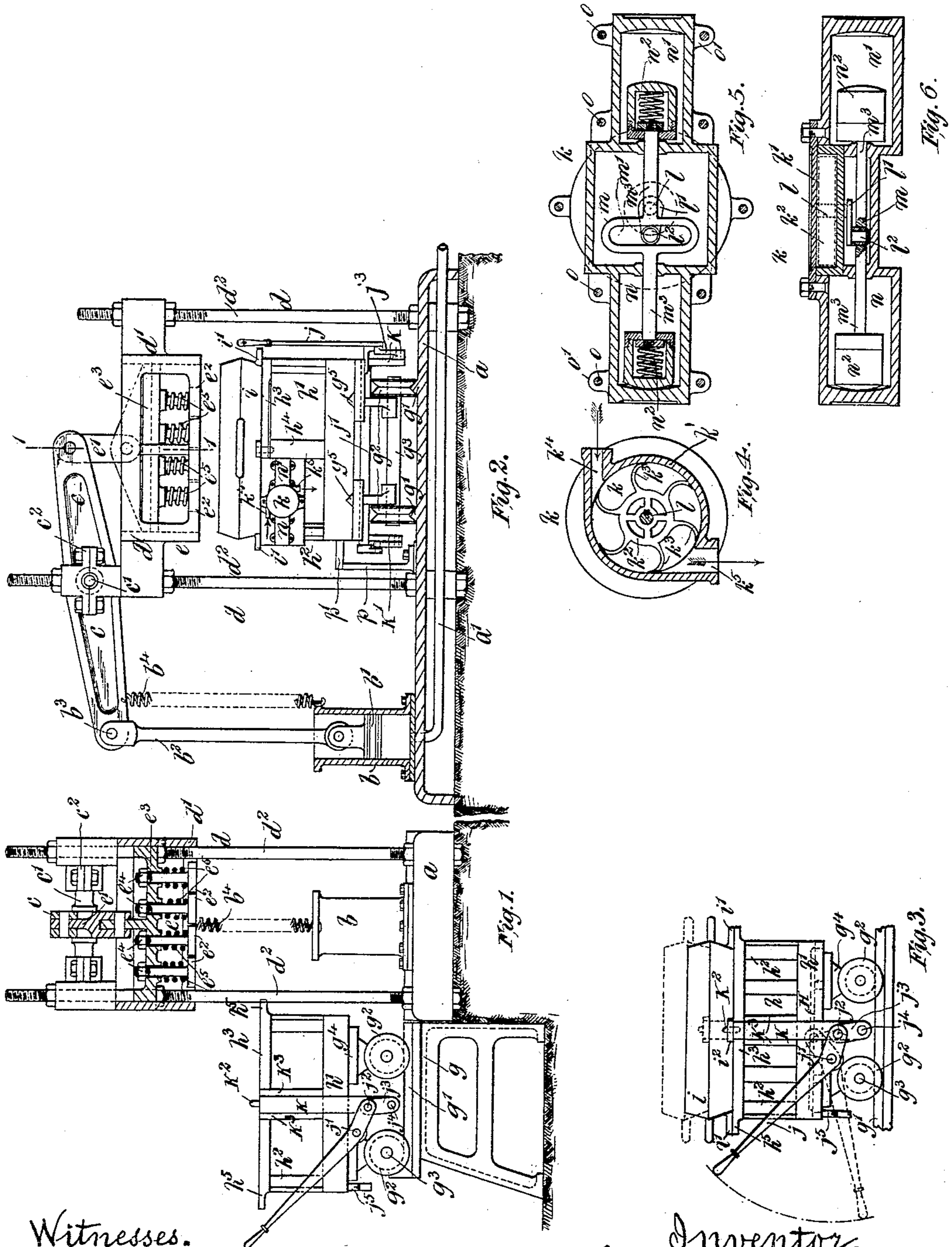
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Patented July 8, 1902.

J. J. McCLELLAND.
SAND MOLDING MACHINE.

(Application filed Mar. 8, 1900.)

(No Model.)



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SAND-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,078, dated July 8, 1902.

Application filed March 8, 1900. Serial No. 7,776. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAMES McCLELLAND, a subject of the Queen of Great Britain and Ireland, residing at and whose post-office address is No. 100 Cadogan Terrace, Victoria Park, London, England, have invented certain new and useful Improvements in Sand-Molding Machines, of which the following is a specification, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a sand-molding machine designed to work quickly and insure perfect molding and is adapted to take a mold of any class of work.

Briefly, the machine consists of a strongly-built frame, in the upper part of which a rammer is reciprocated from one end of a rocking lever fulcrumed on the frame, the other end of the lever being worked from a cylinder in which a piston is actuated by steam, hydraulic, or air pressure. The mold box or flask carriage which holds the molding-box is mounted on wheels and is adapted to run into the lower part of the frame above mentioned under the rammer, which is then caused to descend upon the molding box or flask and make the mold. The rammer is then reversed and the mold-box carriage is withdrawn from under the rammer to remove the completed mold and, if necessary, fix a new mold-box.

Such invention is fully shown and described in the following specification, of which the accompanying drawings form a part, wherein similar letters of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 shows a front elevation of the molding-machine with the upper part in section on the line 1 1 of Fig. 2, the mold-box carriage being drawn out from under the rammer. Fig. 2 shows a side elevation of same, the cylinder for operating the lever alone being in section and the mold-box carriage being in working position under the rammer. Fig. 3 shows a front elevation of the mold-box carriage separate. Fig. 4 shows a sectional side elevation of the rotary part of a vibrating engine which is attached to the mold-box carriage in Fig. 2 to insure a clean and sharp mold. Fig. 5 shows a longitudinal vertical

section of the whole engine. Fig. 6 shows a longitudinal horizontal section of Fig. 5.

Referring to Figs. 1, 2, and 3, a is the base or foundation plate upon which the machine is mounted and built. At one end of this frame a vertical cylinder b is mounted, in which a piston b' is reciprocated by steam, air, or other pressure, which is admitted to the cylinder by the pipe a' in the foundation a . Attached to the piston is a connecting-rod b^2 , which is connected at its other end b^3 to one end of a rocking lever c , fulcrumed on the shaft c' , journaled in bearings c^2 on the rammer-frame d . b^4 is a spring having one end fixed to the cylinder b and the other end fixed to the end of the lever c for the purpose of returning the rammer and piston to their normal positions after being operated. The rammer-frame d consists usually of four metallic standards d^2 , secured by screw-bolts or in any other desired manner to any suitable firm foundation, to the tops of which standards is firmly secured, usually by screw-nuts, as shown, a top portion d' , provided at the center with suitable slideways, in which reciprocates up and down the rammer e . The other end of the rocking lever c is connected with the rammer e by link e' , as shown clearly in Fig. 1. The rammer e consists of a preferably square frame with an adjustable face formed by a number of square-headed bolts e^2 , (in this machine there are sixteen,) which pass through and depend from a plate e^3 in the rammer e . The bolts e^2 are held by nuts e^4 at their upper ends and are fitted with strong springs e^5 beneath the plate e^3 and behind the square heads of the bolts e^2 . Thus, if required, the density of the sand over the pattern in certain places may be regulated by screwing up the nuts on the bolts.

The base-plate of the rammer-frame and the tops of the mold-box-carriage platform are on the same level, and rails g' are laid on the base-plate a and on the mold-box-carriage platforms g , on which the mold-box carriages h run, the same being fitted with correspondingly-grooved wheels g^2 for that purpose.

The mold-box carriages h , which are the principal features of this invention, are constructed as follows: The wheels g^2 are mount-

ed on axles g^3 , and fitted on these are bearings g^4 , which support by the Λ -shaped bars g^5 the pattern-plate support h' . The bars g^5 are Λ -shaped to prevent sand lodging on them.

5 The pattern-plate support h' is an inclosure, preferably of rectangular shape, the corners of which project upward in four columns h^2 . These pass through the pattern-plate h^3 and support the molding-box i . The pattern-

10 plate h^3 is supported by two other columns h^4 , each arranged at about the center of two of the sides of the carriage-plate h' . The pattern-plate h^3 is provided with ears or lugs h^5 , in which holes are formed to engage with pins

15 projecting from corresponding lugs i' on the molding-box i ; but as such a pin-joint is well known and long used to prevent side motion of joined parts I have not deemed it necessary to show the same in the drawings.

20 To raise the mold from the pattern-plate, a hand-lever j is used, which is fulcrumed on and operates a shaft j' , passing from side to side under the pattern-carriage. On one side the end of the lever j is attached at j^2 to a link

25 j^3 , which is connected at j^4 to a vertical sliding bar K. On the other side a crank operated by the shaft j' is connected to a link similar to j^3 , which operates a similar sliding bar K on the other side of the mold-box car-

30 riage. The upper ends of the sliding bars K are fitted with projecting pins K^2 , which engage with corresponding holes formed in lugs i^2 , projecting from the molding-box. To insure steadiness, the sliding bars K move be-

35 tween guides K^3 on the pattern-carriage. Thus when the hand-lever j is thrust downward the sliding bars K will be caused to travel upward and raise the molding-box i from the pattern-plate h^3 . The mold may

40 then be removed, and while this is being done the molding-box is kept in the raised position by the engagement of the lever j with a spring-catch j^5 on the mold-box carriage, as shown by the dotted lines in Fig. 3.

45 The patterns are designed to remain fastened onto the plate; but, if required, suitable stripping-plates can be used, according to the class of work.

To insure a clean and sharp mold, a vibra-

50 tor k is brought into action directly after the withdrawal of the rammer.

Referring to Figs. 4, 5, and 6, k' is a cylinder, in which rotates a disk k^2 , on the periphery of which a number of curved vanes k^3 are

55 fixed. The disk k^2 is keyed onto a central shaft l , and when steam or other elastic fluid is admitted to the cylinder k' through the port k^4 the steam impinging onto the curved vanes k^3 will cause the disk, and consequently

60 the shaft l , to rotate. The steam exhausts through the port k^5 . The shaft l projects through one side of the cylinder, Fig. 6, and is fitted with a crank l' , the crank-pin l^2 on the end of which engages a vertical slot m' ,

65 formed in a link m , connected with which and extending in opposite directions are two

strikers m^3 m^3 . As the crank revolves, the strikers will be reciprocated in casings n n' . Each of the strikers are fitted with a spring-cap n^2 to decrease their impact upon the end 70 plates of the casings n n' .

The vibrator k , above described, is, as shown in Fig. 2, fixed near the top of the mold-box carriage by bolts o , which pass through the lugs o' , and being thus firmly secured to 75 such carriage it will be seen that the rapid rotation of the disk k^2 on the admission of steam to the cylinder inclosing the same will cause the reciprocation of the strikers m^3 , so as to deliver a series of rapid blows against 80 the ends of the cylinders in which the same reciprocates, whereby a vibration or jarring will be set up sufficient to shake the sand down into proper consistency. This beating or pounding of the strikers m^3 , it will be at 85 once apparent, will be transmitted to the carriage, and consequently to the removable flask supported thereby, which carries such strikers, the action being the same as though a table on which was standing a box of loose 90 sand was struck rapid blows from a hammer directed against its edge. This vibrator is preferably driven at high speed, and the vibration thus set up will effectually prevent the sand sticking to the pattern. 95

Referring to the machine generally, when the mold-box carriage is brought under the rammer it is held stationary by a locking-arm p , fixed to the base-plate a , such arm en- 100 gaging a projection p' and the two being provided with an interlocking device of any desired form (not shown) for such purpose on the mold-box carriage.

The machine is operated as follows: The mold-box carriage is got ready with the mold- 105 ing-box filled with sand and the pattern-plate being fixed in place. It is then wheeled under the rammer, where it is secured by arm p and projection p' . The power is then turned on and the piston h' in the cylinder will be 110 forced up and rock the lever c and bring the rammer down upon the molding-box. The mold is instantly formed and the power is turned off, the cylinder exhausting through, preferably, a three-way cock. (Not shown.) 115 The rammer will then be raised by the action of the spring b^4 , and the mold-box carriage can be drawn back to its platform for the removal of the mold.

It will thus be seen that the improved sand- 120 molding machine hereinbefore described is adapted for any class of molding and effects great economy of cost and space, while the carriage-platform being isolated from the machine prevents damage which might be done 125 to one mold due to shock while ramming another while the first was still adjacent.

For small workshops the machine may be operated by any suitable form of hand-gear, which would be substituted for the steam- 130 actuated gear above described.

Having now described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a sand-molding machine, the combination with a bed, of a railway carried by the
5 bed, an extension of the railway adjacent thereto mounted upon a bed disconnected from the first-mentioned portion of the railway, a mold box or flask carriage mounted on the railway, a frame carried by the bed, a
10 rammer carried by the frame, means for reciprocating the rammer, a mold box or flask carried by the mold box or flask carriage and provided with perforated lugs i^2 , upright
15 standards K having pins K^2 adapted to enter the perforations i^2 carried by the carriage, and a lever for reciprocating the standards K, substantially as shown and described.

2. In a sand-molding machine, the combination with a bed, of a railway carried by the
20 bed, an extension of the railway adjacent

thereto mounted upon a bed disconnected from the first-mentioned portion of the railway, a mold box or flask carriage mounted on the railway, a motor carried by the mold box or flask carriage, and mechanism also carried
25 by the mold box or flask carriage and actuated by the motor for vibrating such carriage, a frame carried by the bed, a rammer carried by the frame, means for reciprocating the rammer, a mold box or flask carried by the mold
30 box or flask carriage, and mechanism carried by the mold box or flask carriage for lifting the mold box or flask from the completed mold, substantially as shown and described.

In witness whereof I have hereunto set my
35 hand in presence of two witnesses.

JOHN JAMES McCLELLAND.

Witnesses:

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HENRY E. DOD.