(No Model.)

# M. R. MOORE.

## SAND MOLDING MACHINE.

No. 346,379. Patented July 27, 1886.

FIG 1

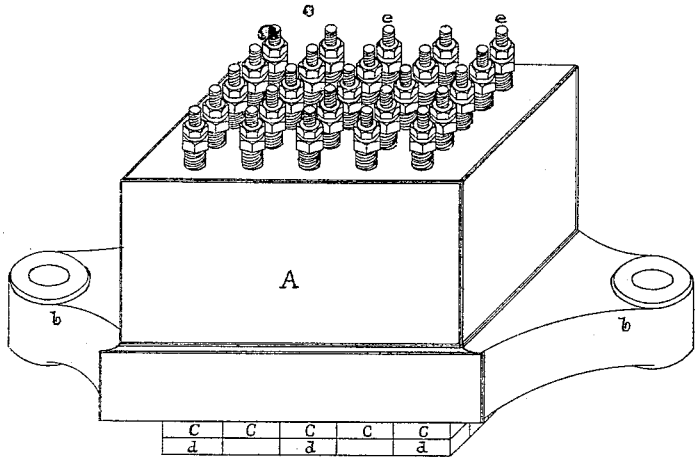



FIG 2

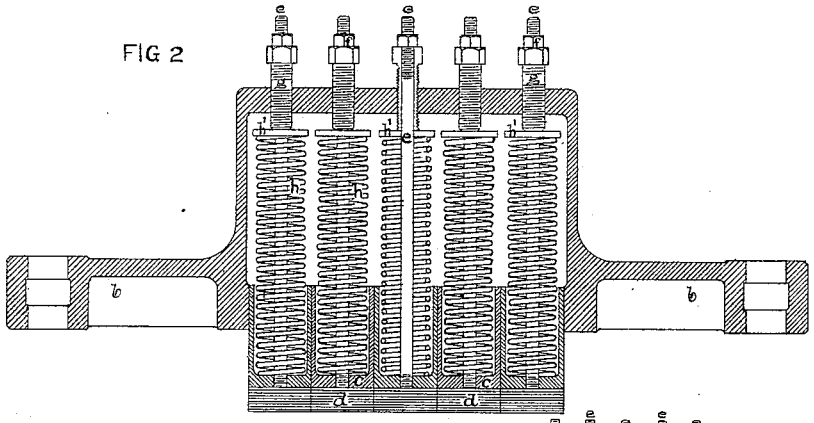



FIG. 3

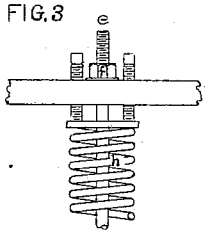
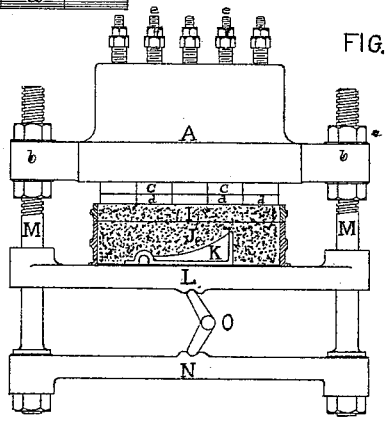



FIG. 4




WITNESSES.

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# UNITED STATES PATENT OFFICE.

MATTHEW ROBERT MOORE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE PNEUMATIC COMPANY, OF SAME PLACE.

## SAND-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,379, dated July 27, 1886.

Application filed March 18, 1886. Serial No. 195,696. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHEW ROBERT MOORE, of the city of Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Machinery for Making Sand Molds for Castings; and I do hereby declare that the following specification is such a full, clear, and exact description of my invention as would enable any person skilled in the art to which it pertains to understand, construct, and operate the same, reference being had to the drawings hereto attached and forming part of this specification, and to the letters of reference marked thereon.

My invention relates to that part of a sand-molding machine variously known as the "presser," "platen," "follower," or "cover," being that part between which and a similar part carrying a pattern the sand is pressed or compacted in the operation of forming a mold; and my improvement consists in a better mode of constructing the part, whereby it is made more perfectly to serve its purpose.

In sand-molding machines as generally constructed the platen is a strong inflexible plate, ribbed or otherwise strengthened, so as rigidly to resist the strain of compacting the sand. This construction has proved objectionable from the fact that it allows of no compensation for the varying thickness of the body of sand to be compressed, caused by the uneven shape of the pattern, the effect being to compact the thinner portions of the sand too hard. Recently, however, machines have been devised wherein the platen or presser is made flexible, so that it can adapt itself to irregularities in thickness of the sand by yielding in any part as soon as the resistance to compression of the sand opposite it reaches the limit of pressure to which it should be subjected. Of this class are the inventions for which Letters Patent were granted me July 22, 1884, numbered 302,349; reissued February 24, 1885, and numbered 10,562; granted May 26, 1885, and numbered 318,784; granted November 24, 1885, and numbered 331,208, as also those described in an application for patent filed February 6, 1886, and in another application of even date herewith now pending. In all of these the flexible yielding or sectional presser or platen is arranged to be operated by means of fluid-pressure.

The invention which is the subject of the present application is likewise a form of flexible or yielding platen, but differs from the foregoing, in that the yielding parts are simply held in place by the elastic force of helical springs. The pressure required to pack the sand may be produced by any convenient means, operating either to force the platen against the sand or the sand against the platen, the springs permitting the parts of the platen to which they are attached to yield and give back under the pressure whenever it equals the tension of the springs, which is adjustable. This affords a ready means of regulating the compression of the body of sand in the flask to the requirements of each case independent of variations in its thickness or of irregularities of patterns. A platen so made would be applicable to any style of sand-molding machine, whether the pressing force be produced by fluid-pressure or by cams, levers, or other mechanical means.

Referring now to the drawings, where Figure 1 is a perspective and Fig. 2 a sectional view of my improved platen or presser, Fig. 3 a detail of construction, and Fig. 4 an illustration of a mode of application, I will proceed more particularly to describe my invention.

The outer part or frame of the platen A is of box-like shape, and is provided with lugs or projections, as *b b*, for properly attaching it to the other parts of a sand-molding machine. Into the open side of this frame, which is to face the flask and sand, a number of prismoidal sections or rammers, *c c*, are fitted. These rammers are of such size and shape as collectively to fit the opening of the frame and mutually to fit each other, so as completely to fill the opening. The drawings show them of square section; but they may be triangular, quadrilateral, or hexagonal, if either of those shapes better suit the conditions. They may be of any suitable material; but I prefer them of metal, and made hollow to economize weight and space. I prefer, also, to face them with rubber or other soft and elastic substance, which, by spreading laterally under pressure, will cause the faces to bear tightly against each other and prevent the

sand gaining access to the joints between the sides of the rammers; but I do not deem this facing essential. It is shown at *d d* in the drawings. From the end of each rammer opposite the face, inside the rammers, if they be hollow, as shown in the drawings, projects a stem, *e e*, which is threaded and carries a nut, *f f*. The stems pass through holes in the side opposite the opening of the box-like frame A. The holes are much larger than the stems, and are threaded to receive the hollow backing-bolts *g g*, through which the stems pass; or I may substitute for the hollow bolts *g g* for each stem two or more ordinary ones, between or in the midst of which the stems may pass, as shown in Fig. 3.

Surrounding each of the stems *e e* is a helical spring, *h h*, whose ends abut against the rammer *c*, and a washer, *h'*, which surrounds the stem and receives the thrust of the backing-bolts *g*. By means of these backing-bolts and of the stem-nuts *f f* the tension of the springs *h h* may be varied, and the faces of the rammers brought even with each other, or adjusted to such superficial contour as may be desired.

The operation of this improved platen will easily be understood by reference to Fig. 4, wherein A represents the frame of platen with rammers *c c;* I, a sand-feeding box; J, a flask of sand containing a pattern, K, resting upon an opposing platen or table, L. M M are rods or distance-pieces joining the platen A to a yoke or base piece, N, from which a toggle-joint, O, extends back to the table L. The toggle-joint is intended to represent any means of applying force whereby the platen A and table L may be made to approach each other. It will readily be seen that when the rammers bear upon the sand, whether the platen A moves toward the table L or the table moves toward the platen, the sand will be compressed, and condensation of its volume will take place until resistance to further compression equals the tension of the springs. Each rammer, as the sand beneath it reaches this condition, will yield, and no further compacting will take place there. Thus the degree of compression may be regulated by means of the adjustments provided for the springs, and the whole surface of the flask subjected to a perfectly controllable pressure, independent varying thicknesses of sand and pattern and of the extent of motion and intensity of force producing the pressure.

I claim as my invention and desire Letters Patent for—

1. A yielding presser, platen, or follower comprising, essentially, a series of contacting independent movable sections, each section held against pressure by the constant force of a spring, and the whole arranged to serve with a flask and patterns and to yield irregularly to the sand, as set forth.

2. A yielding presser composed of independent movable sections having contact with each other, each section held against pressure by the constant force of an independent spring, and means, substantially as described, for adjusting the resisting force of each section independently, as herein specified.

3. A yielding presser, platen, or follower composed of a frame or containing piece, A, in combination, movable sections or rammers, as *c c*, held out against pressure by means of springs, as *h h*, when adapted to be used in connection with a flask and pattern for the production of sand molds for castings, as set forth.

4. In a machine for making sand molds for castings, the springs *h h*, provided with separate and independent means, as *g g*, for adjusting their tension, in combination with the movable sections or rammers *c c*, and with the frame or containing piece A, the whole forming a yielding platen, operating in the manner and for the purpose substantially as described.

In testimony whereof I have hereunto set my hand at Indianapolis, Indiana, this 16th day of March, 1886, in the presence of two subscribing witnesses.

MATTHEW ROBERT MOORE.

Witnesses:
ROLLIN DEFREES,
H. H. HANNA.