

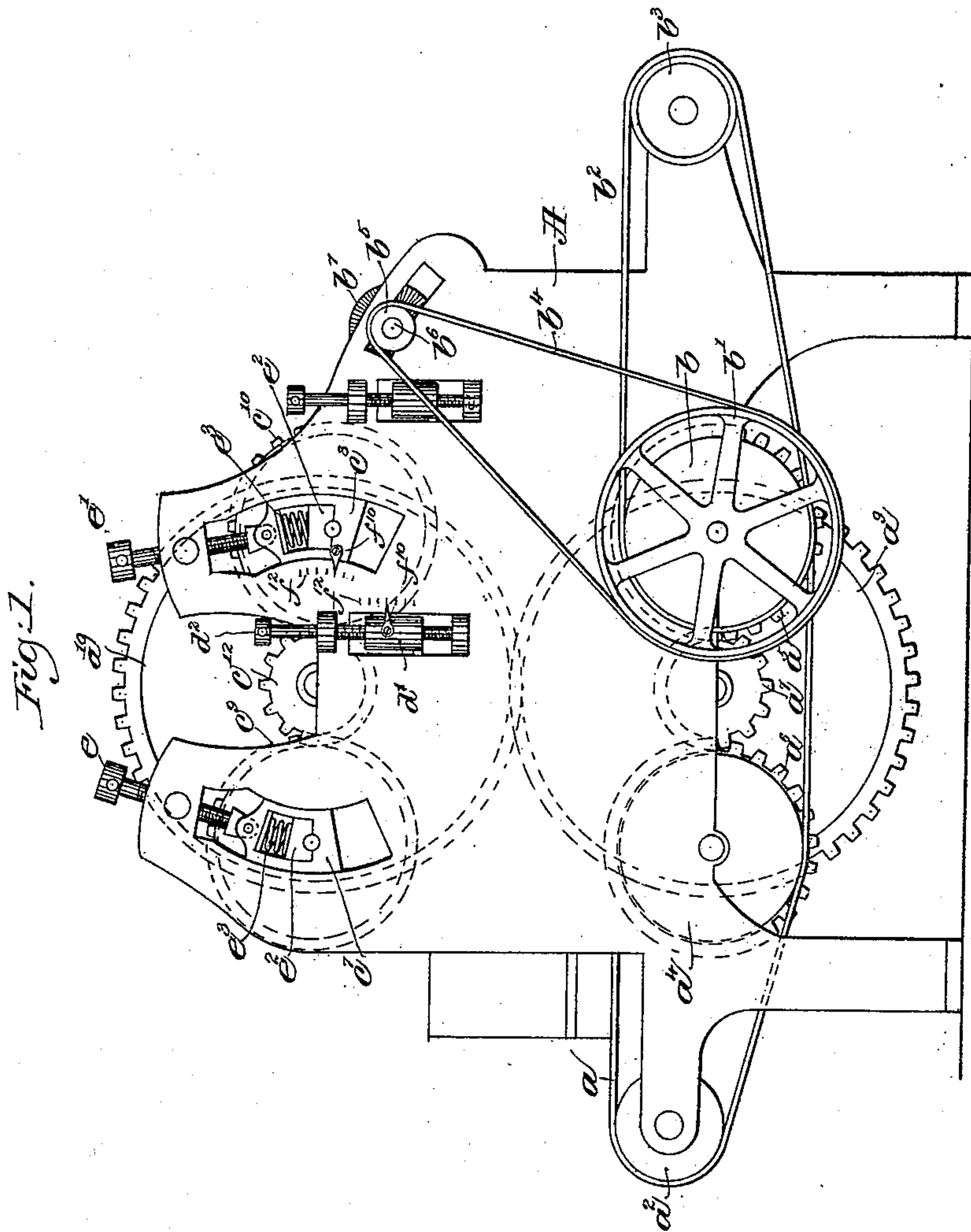
(No Model.)

3 Sheets—Sheet 1.

W. E. BIRD.
SAND MOLDING MACHINE.

No. 400,893.

Patented Apr. 9, 1889.



Witnesses.

Edgar A. Goddard

Frederick L. Emery

Inventor.

William E. Bird,

by Lemby & Gregory
Attys

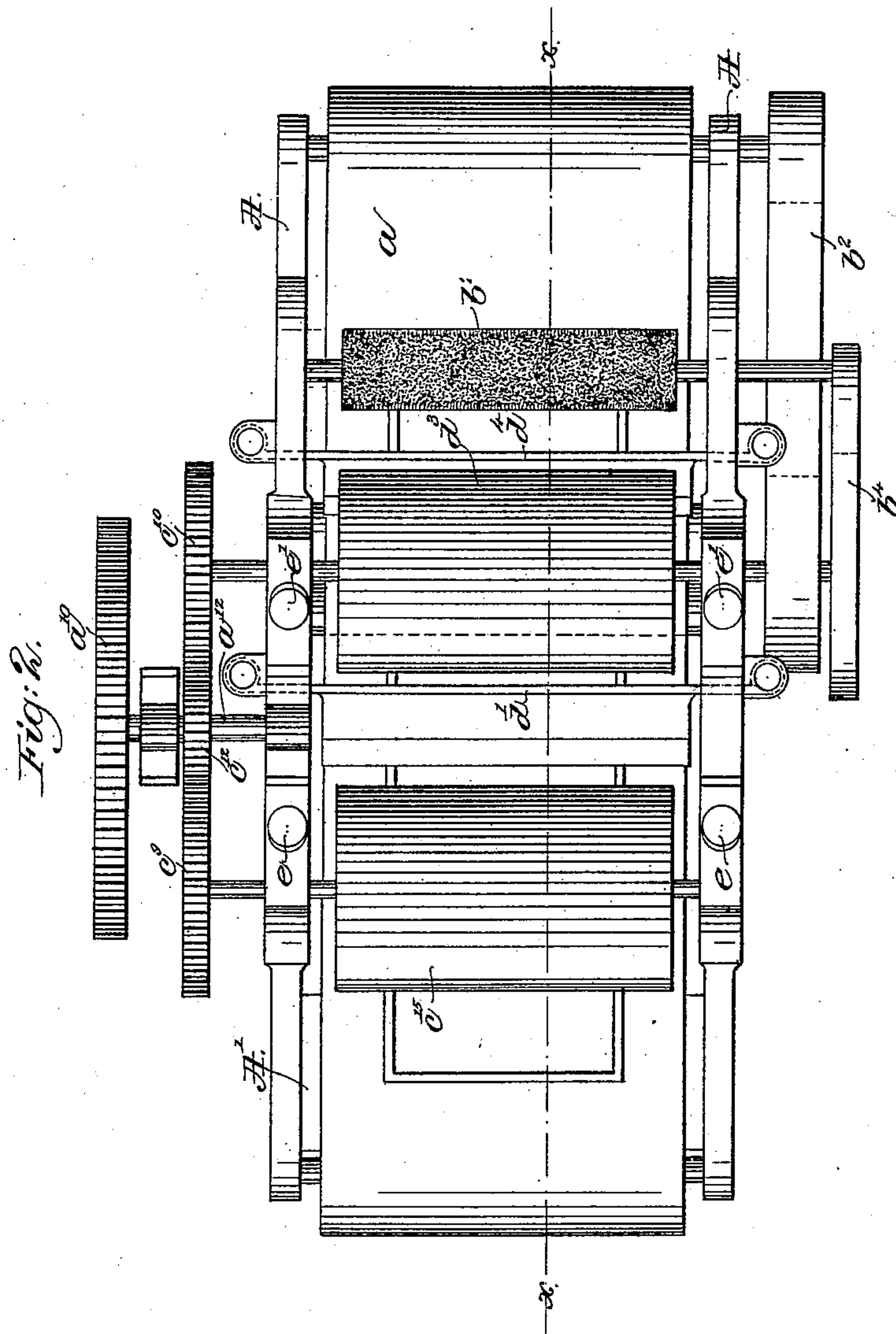
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Witnesses.

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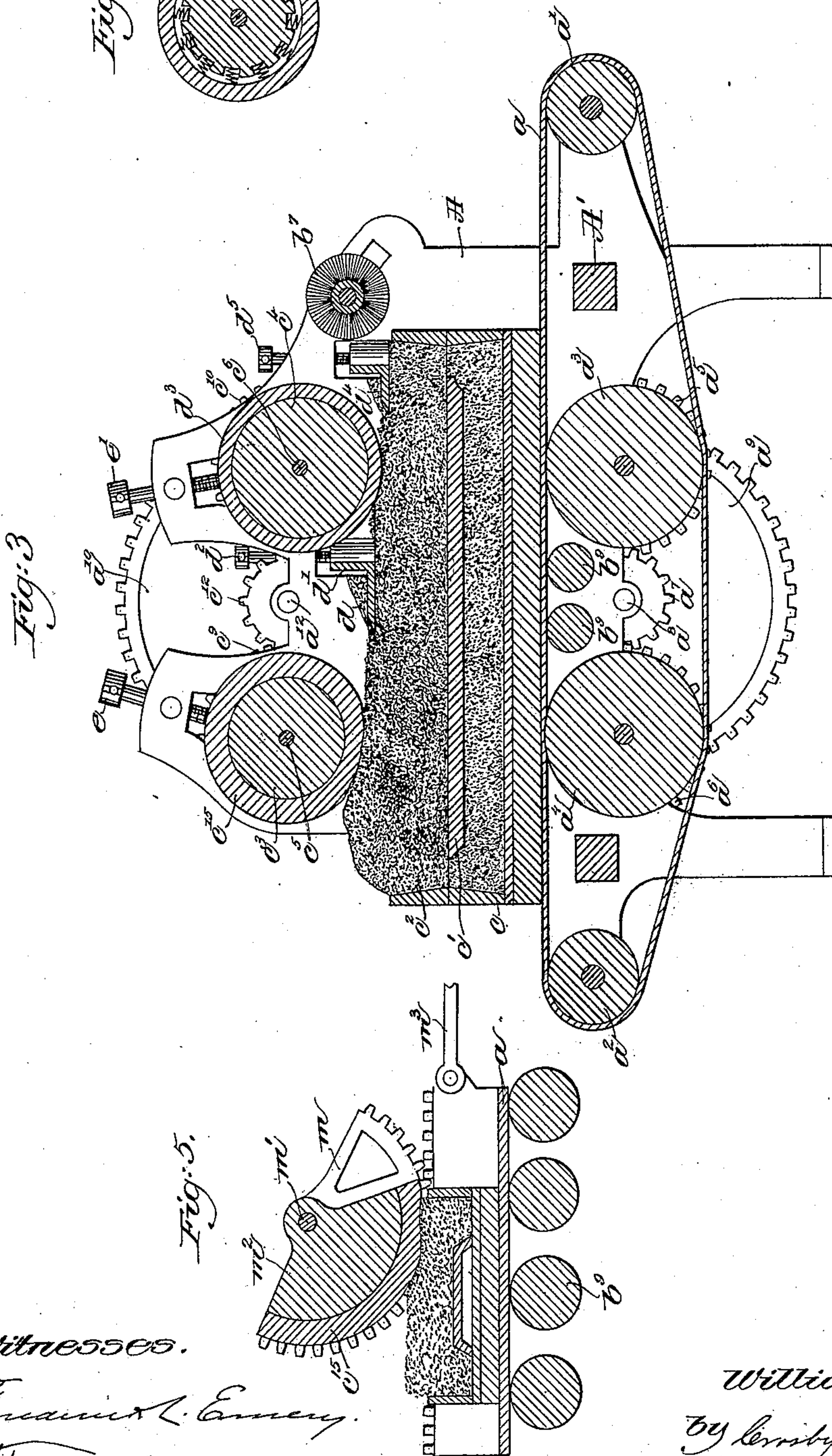
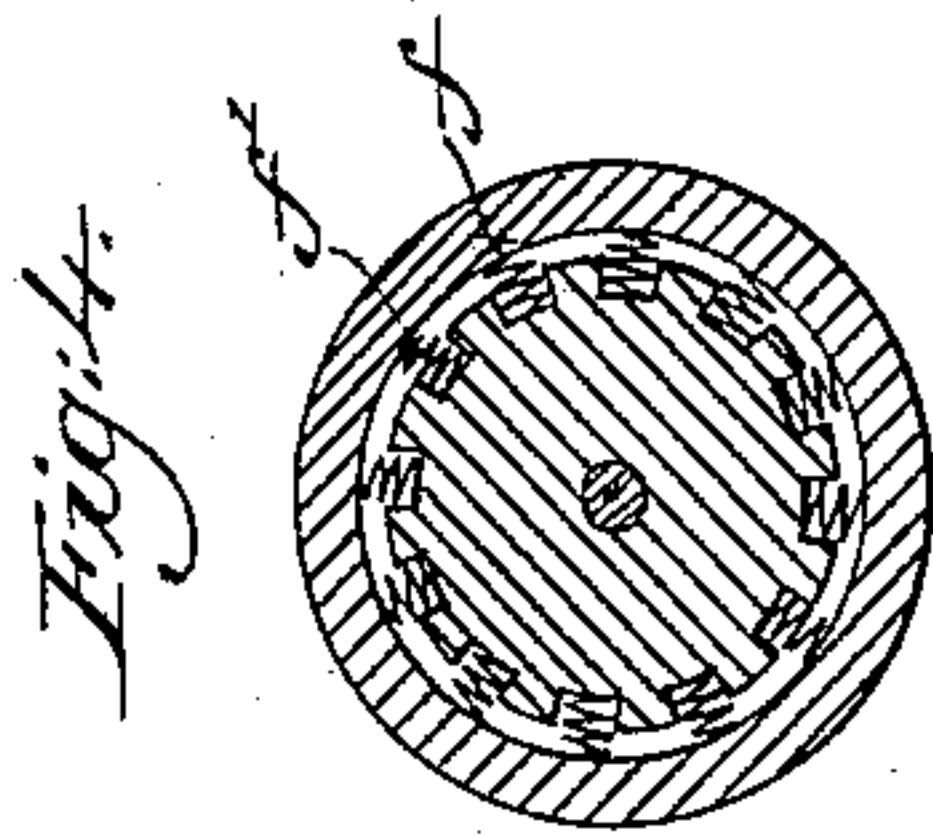
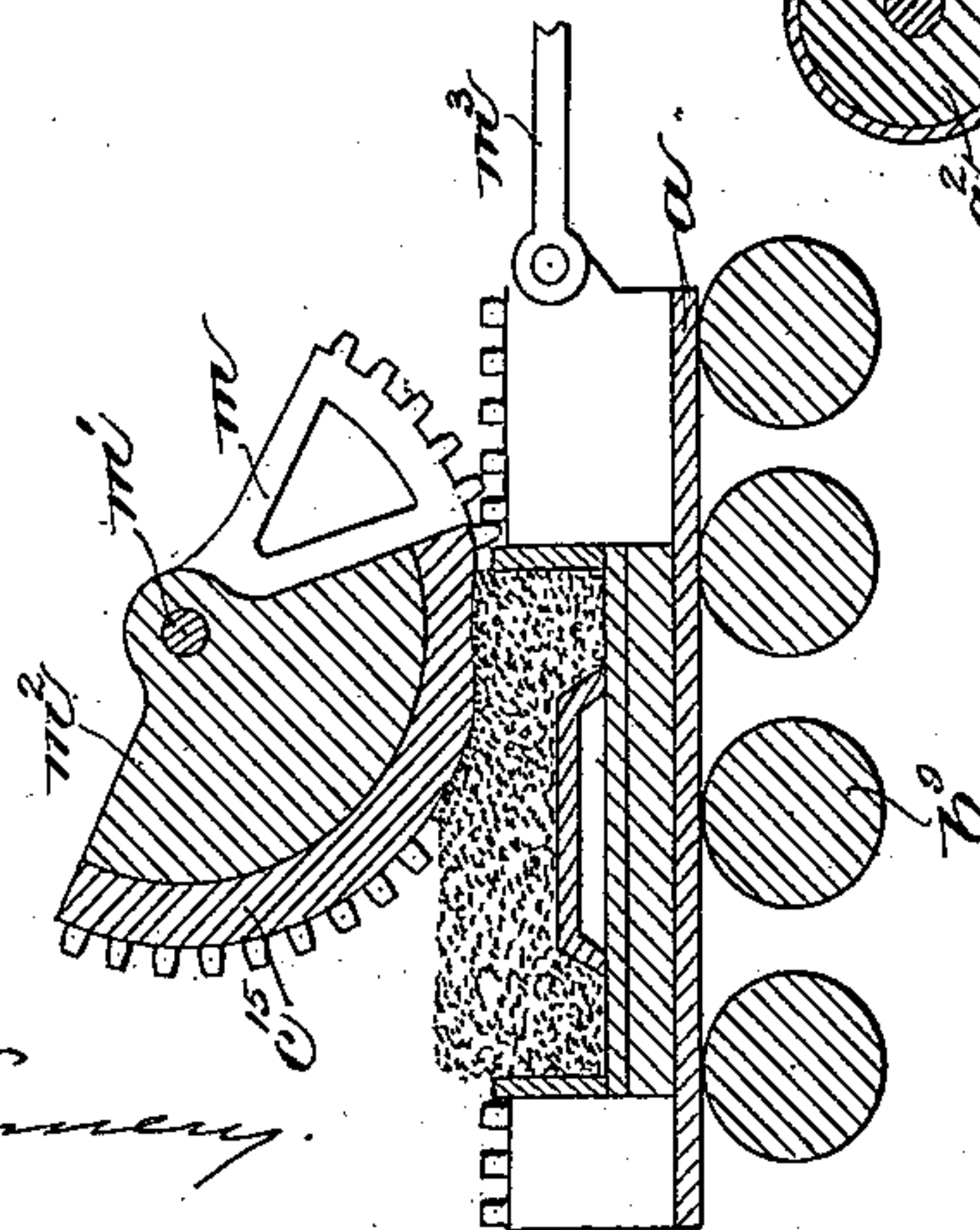


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM E. BIRD, OF BOSTON, MASSACHUSETTS.

SAND-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 400,893, dated April 9, 1889.

Application filed September 3, 1888. Serial No. 284,390. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. BIRD, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Sand-Molding Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a machine for compressing dampened sand or, as it is commonly called, "green sand" about a pattern in a molding-flask, whereby the said sand is more evenly compacted, and a more perfect casting and one free from blow-holes is produced. In the production of castings it is especially desirable that the sand be pressed or compacted to a uniform density, and as now commonly practiced this is effected by hand tamping or ramming, which is a slow and laborious and consequently expensive process.

My invention has for its object to provide a machine by which "green" or damp sand in a flask may be pressed or uniformly compacted to a degree approximating hand-tamping.

In accordance with my invention, I employ a revolving presser, herein shown as a roller having a yielding surface, which is sufficiently rigid to press or compact loose sand, and which yields when brought into contact with hard lumps or nodules of sand.

My invention therefore consists, essentially, in a sand-molding machine, of a bed to support a flask or mold containing the sand and pattern, and a revolving presser having a yielding surface, the said bed and presser being made movable one with relation to the other, whereby the surface of the sand is acted upon in a direction transverse to the axis of the presser, substantially as will be described.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of one form of machine embodying my invention; Fig. 2, a top or plan view of the machine shown in Fig. 1; Fig. 3, a longitudinal section of the machine shown in Fig. 2 on line *xx*; Fig. 4, a modified form of presser-roller, and Fig. 5 modification to be referred to.

The frame to support the working parts of the machine is composed, as herein shown, of sides A and cross-piece A'.

The machine is herein shown as provided with a movable bed, preferably an endless belt, *a*, of leather, canvas, or other suitable material, which is passed about rollers *a'* *a''* at opposite ends of the machine and over rollers *a'''* *a''''*, intermediate of the rollers *a'* *a''*, the said rollers having their shafts or arbors supported in suitable boxes in the sides of the machine. The shafts of the rollers *a'''* *a''''* have mounted on them at one side of the machine gears *a⁵* *a⁶*, respectively, in mesh with and driven by a pinion, *a⁷*, on a shaft, *a⁸*, having mounted on it a large gear-wheel, *a⁹*, which meshes with and is driven by a similar gear-wheel, *a¹⁰*, on a shaft, *a¹²*, supported in bearings above the bed *a*. The shaft of the roller *a'''* has mounted on it at one end pulleys *b b'*, the pulley *b* being connected by belt *b²* with a pulley, *b³*, on the shaft of the roller *a'*, and the pulley *b'* being connected by belt *b⁴* with a pulley, *b⁵*, on a shaft, *b⁶*, provided, as shown, with a brush, *b⁷*. The traveling bed *a*, near the center of the machine, is supported by auxiliary rollers *b⁹*. The bed *a* supports the flask or mold *c*, provided with the pattern *c'*, the said flask or mold being of any desired or ordinary construction and in practice filled with dampened or green sand *c²*.

The green sand in a loose state in the mold is uniformly pressed or compacted therein preferably by two presser-rollers, *c³* *c⁴*, mounted on shafts *c⁵* *c⁶*, having their journals supported, preferably, in adjustable boxes *c⁷* *c⁸*, (see Fig. 3,) the said shafts being provided with gears *c⁹* *c¹⁰* in mesh with and driven by a pinion, *c¹²*, on the shaft *a¹²*. The roller *c³* in practice will preferably be a trifle higher from the sand than the roller *c⁴*, and the roller *c³* will be provided with a yielding surface, *c¹⁵*, preferably of rubber, so that as the flask is moved by the traveling bed under the roller *c³* the loose sand will be compressed, while the hard lumps or nodules of sand will not be compressed, but will indent or sink into the yielding surface *c¹⁵*. The surface of the sand, after passing from under the yielding surface *c¹⁵*, is preferably leveled or smoothed by a leveler, *d*, (herein shown as a blade or knife,) preferably adjustably sup-

ported in the sides of the machine, the said knife or blade having at its opposite ends, as herein shown, a threaded boss or hub, d' , through which is extended a threaded bolt or rod, d^2 . The knife or blade d cuts the lumps or nodules of sand and renders the surface substantially smooth. The sand, after passing by the lever d , is preferably subjected to the action of the second roller, c^4 , provided with a yielding surface, d^3 , made or composed of somewhat harder material than the surface c^{15} , and the surface of the sand, after passing under the second yielding presser, is preferably acted upon by a second leveler, d^4 , also made adjustable in the sides of frame by the thread rod or bolt d^5 .

The rollers c^3 c^4 are vertically adjustable by means of threaded rods or bolts, e e' , pivotally connected to the journal-boxes c^7 c^8 , fitted into slots in the sides A, the said journal-boxes being provided with openings, in which are fitted the caps e^2 , normally secured in place by the spring e^3 .

I have herein shown the bed supporting the flask or mold made movable, and while I prefer such construction when large castings are to be made the said bed in some instances, as when small flasks or molds are used, may be stationary and the yielding presser made movable in any suitable manner, as by a crank.

Instead of the yielding presser being formed of rubber or other material of a yielding nature, the same may be formed of a flexible material, f , (see Fig. 4,) such as leather having a backing of springs, f' , or other yielding material, the said springs being located in suitable recesses or sockets in the roller.

The loose sand on the flask, after the latter has passed by the leveler, is removed by the revolving brush b^7 .

I have herein shown the presser-roller forming part of a machine; but I do not desire to limit my invention to any particular form of machine, as the presser-roller may be operated by hand with good results, especially on small work.

I do not herein claim compressing green sand by means of a roller having a hard surface, as such device is not adapted to accomplish a uniform compression of the sand. For instance, if the pattern be irregular in outline, then the sand above the high parts of the pattern would be compressed too much, while the greater quantity or body of sand above the low parts of the pattern would not be compressed enough.

With a yielding presser the sand of the high parts of the pattern would be embedded in the yielding presser, and would not be excessively compressed, while the sand over the low parts of the pattern would be compressed. So, also, I do not desire to limit myself to the use of the particular form of

leveler herein shown, as other forms may be used—as, for instance, a rake having fine teeth.

Referring to Fig. 5, the traveling bed a is shown as a table or platform provided with sides having teeth to mesh with the teeth of a sector, m , mounted on a shaft, m' , upon which is secured the sector m^2 of a roller provided with a yielding surface, c^{15} , and forming my improved revolving presser. The table or bed a is provided with a connecting-rod, m^3 , by which the said table may be reciprocated to produce oscillation or revolution of the yielding presser.

In order that the yielding presser and leveler may be adjusted to the desired height or distance from the bed to produce uniformity of work, I have provided the said leveler and presser with an index, f^{10} , (see Fig. 1,) which registers with a graduated scale, f^{12} , on the side of the machine.

I claim—

1. In a sand-molding machine, the combination, with a bed to support a flask or mold containing the sand and pattern, of a revolving presser having a yielding surface, the said bed and presser being made movable one with relation to the other, whereby the surface of the sand is acted upon in a direction transverse to the axis of the presser, substantially as described.

2. In a sand-molding machine, the combination, with a bed to support a flask or mold containing the sand and pattern, of a revolving presser having a yielding surface, a leveler, and a second presser, the said bed, pressers, and leveler being made movable one with relation to the other, to operate substantially as described.

3. In a sand-molding machine, the combination, with a bed to support a flask or mold containing the sand and pattern, of a revolving presser having a yielding surface, a leveler, and a second presser, a second leveler, and a brush, the said parts being made movable one with relation to the other, as described, whereby the surface of the sand is acted upon in a direction transverse to the axis of the revolving presser, substantially as described.

4. In a sand-molding machine, a traveling bed to support a flask or mold containing the sand and pattern, combined with a revolving presser having a yielding surface to act on the surface of the sand in a direction transverse to the axis of the presser, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. BIRD.

Witnesses:

JAS. H. CHURCHILL,
F. L. EMERY.