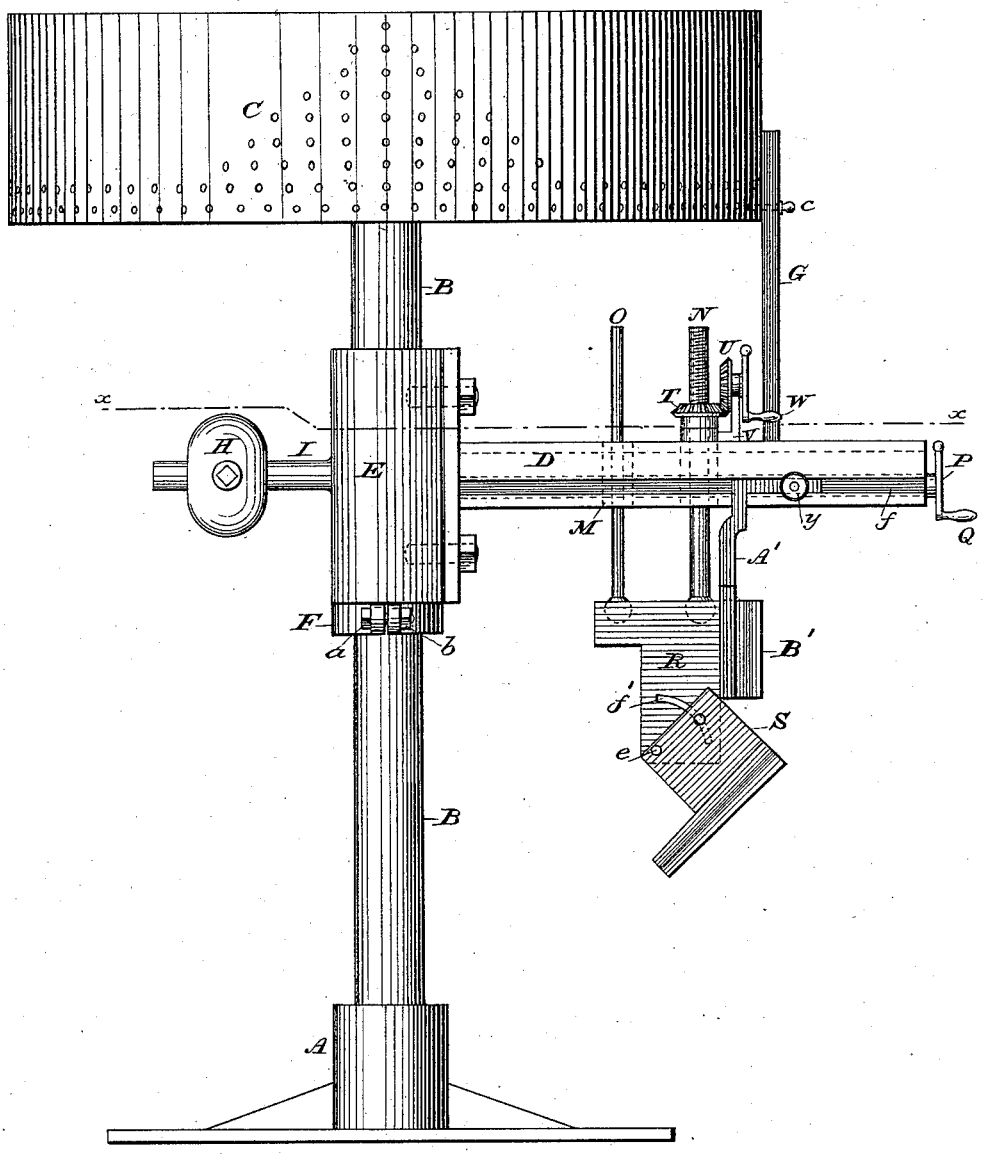
(No Model.) 3 Sheets—Sheet 1.

P. L. SIMPSON.

GEAR MOLDING MACHINE.

No. 305,346. Patented Sept. 16, 1884.

Fig. 1.



Witnesses:

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G. S. Rafter

Inventor:

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(No Model.) 3 Sheets—Sheet 2.

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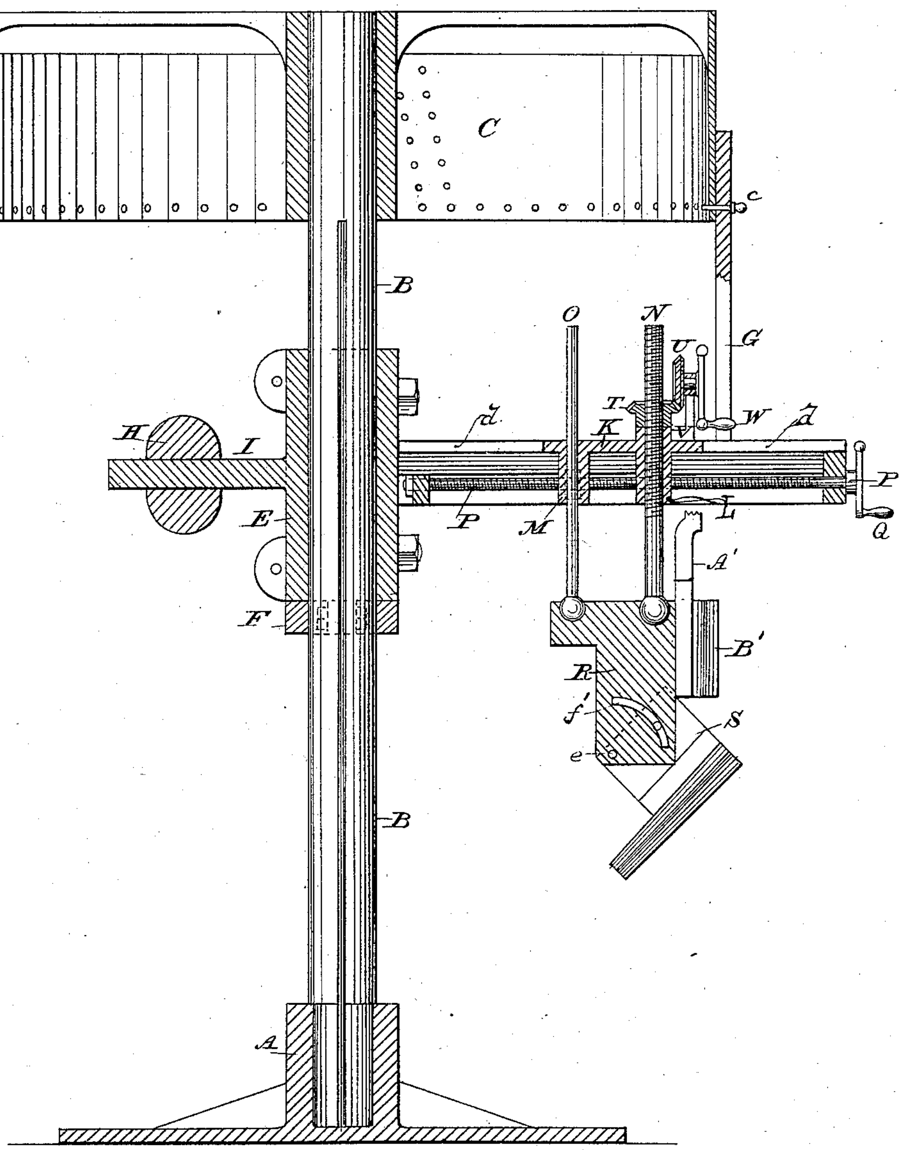
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

P. L. SIMPSON.

GEAR MOLDING MACHINE.

No. 305,346. Patented Sept. 16, 1884.

Fig. 3.

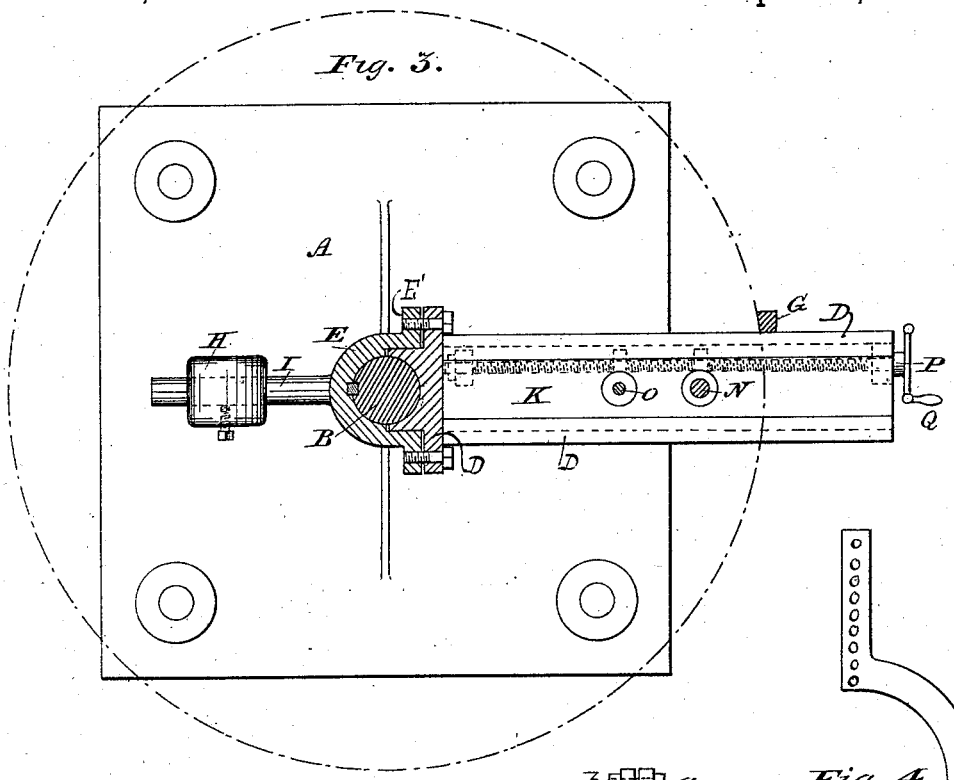


Fig. 4.

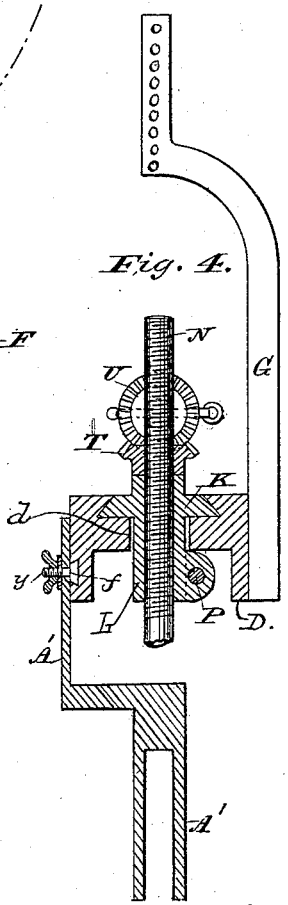


Fig. 5.

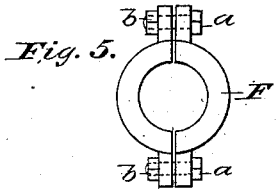
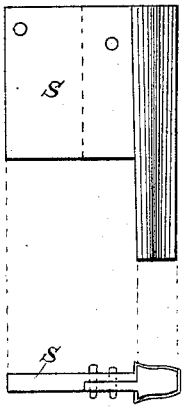
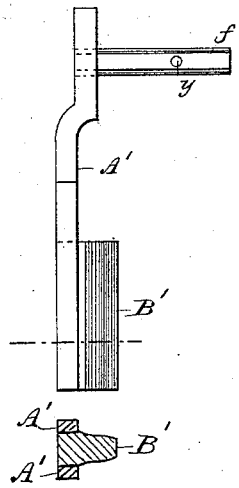


Fig. 6.





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UNITED STATES PATENT OFFICE.

PETER L. SIMPSON, OF MINNEAPOLIS, MINNESOTA.

GEAR-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,346, dated September 16, 1884.

Application filed March 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, PETER L. SIMPSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Gear-Molding Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in gear-molding machines.

The objects of my invention are to secure the accurate spacing of the teeth, the vertical withdrawal of the tooth or teeth patterns, the horizontal movement of the tooth-block, to provide for the horizontal movement of the spur-tooth pattern without breaking away the edges of the mold, and to provide for adjusting the bevel-tooth block or pattern to any angle that may be required.

Figure 1 is a side elevation of the machine. Fig. 2 is a vertical section taken longitudinally through the arm D. Fig. 3 is a horizontal section on line *x x*, showing the split hub. Fig. 4 is an enlarged cross-section of arm D, showing groove, &c. Fig. 5 is a plan view of the split collar. Fig. 6 is a detail view of the pattern for bevel-wheels.

A is a base or socket embedded in the foundry-floor, in which is placed the standard B. The standard B may be provided with a spline fitting into a groove in the socket A, by which means the standard is prevented from turning in the socket. To the top of the standard is secured the index-cylinder C, said cylinder being provided with a series of holes or perforations arranged in circles, each circle of which corresponds to the number of teeth or cogs required on the gear, or any multiple or division thereof.

D is an arm to which the mechanism for moving the tooth-blocks are attached, said arm being secured to one side of the split hub E, said hub having lugs E′ cast thereon to receive bolts for holding the parts together and around the standard B. The hub E and arm D are supported by a split collar, F, said collar being adjustable to any height on the standard B, and secured by means of the bolt *a* and screw-nut *b*.

G is an index-arm, one end of which is secured to the arm D, while the upper end of said arm is adapted to be secured to the index-cylinder C, by means of a pin, *c*, which is passed into a perforation or hole in the index-cylinder, so that after a tooth of the wheel has been molded in the sand the pin *c* is withdrawn and the arm D moved around one space, where it is secured by the means above mentioned and another tooth formed, by which means the accurate and uniform spacing of the teeth is effected.

H is a balance-weight adjustably secured on an extension, I, of the arm D, to counteract the leverage of the arm D on the shaft B, by reason of the weight of said arm and the tooth-forming devices. The arm D is provided with a longitudinal slot, *d*, in which the slide K is moved back and forth, the sides of the slot *d* being provided with beveled rabbets to receive the beveled edges of the slide, as shown in Figs. 2 and 4. On slide K are cast two hubs, L and M, the hub L being bored out to receive the screw-threaded bolt or rod N, and the hub M being bored out to receive the guide-rod O. The slide K is moved back and forth in its ways in the arm D by means of a screw-rod, P, and hand-crank Q, said screw-rod being secured to the slide, and in suitable bearings in the arm D. To the lower ends of the rods N and O are secured the plate or block R, to which the tooth-block S is pivoted at *e*. The tooth-forming block S is designed for forming the teeth of beveled gear-wheels, and is adjustable on the block R by means of a bolt and set-screw passing through the segmental slot *f′*, thus allowing the tooth-block S to be set at any angle to form the teeth of any desired pitch.

T is a miter-wheel provided with a screw-threaded perforation, through which the screw-threaded rod N passes. The miter-wheel T meshes with a similar wheel, U, the shaft of which is mounted in the bracket V, secured to the hub L. The wheel U is operated by the handle W, the rotation of which tends to raise or lower the plate R, together with the tooth-plate, while the rod O prevents the plate R and tooth-block S from twisting or otherwise moving out of position.

A′ is a bifurcated arm, the upper end of which is adapted to slide in the groove *f*. The prongs of the arm A′ project downward on each side of the pattern-tooth B′, so that when the tooth-block is moved inward, after the tooth or teeth patterns are rammed up with sand, by holding the handle Y while the hand-wheel Q is operated, the pattern tooth or teeth sliding out from between the prongs of the arm A′, the latter preventing the sand from falling away by reason of the inward movement of the pattern tooth or teeth toward the central shaft B. The spur-tooth B′ is secured to the tooth-block R, and is designed to form the cogs of ordinary spur-gear.

It will be noticed that by the use of my machine the casing-table is dispensed with, and that by having a number of the sockets A set in the foundry-floor the shaft, index-cylinder, and the other devices can be moved from one socket to the other, and thus facilitate the work of casting, it being understood that the molding-sand is simply placed on the floor of the foundry, and the desired cavities formed therein by the devices already described. It will also be noticed that by placing the arm which carries the slide on which the pattern-teeth are mounted on the central standard, between the index-cylinder and the casting-bed, I am enabled to form the patterns or molds for wheels of large and small diameters, varying in diameter from a point near the central or supporting standard to the outer end of the arm which carries the tooth-holding slide.

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

1. In a gear-molding machine, a stationary bed or socket supporting a central standard, to the upper portion of which, and above the molding-bed, is secured an index-cylinder, a horizontal arm adapted to turn around said central standard beneath the index-cylinder, and carrying adjustable devices for supporting a tooth-block, and a vertical bar connecting the horizontal bar with the index-cylinder, as set forth.

2. In a gear-molding machine, an index-cylinder mounted on a central support or standard above the casting-bed, a swinging arm carrying the tooth-forming devices, secured to the central support, between the index-cylinder and the casting-bed, and a projecting arm connecting the swinging arm with the index-cylinder, as set forth.

3. In a gear-molding machine, an index-cylinder mounted on a central support or standard above the casting-bed, a swinging arm carrying the tooth-forming devices, secured to the central support or standard, between the index-cylinder and the casting-bed, an upwardly-projecting arm connecting the swinging arm with the index-cylinder, in combination with the slide *k*, tooth-plate R, and adjusting devices, substantially such as described.

4. In a gear-molding-machine, a plate carrying the tooth-block provided with an adjusting screw-bolt and a guide-rod, both of which pass through an adjustable slide, a bevel gear-wheel adapted to work on the adjusting-screw and mesh with a similar wheel mounted in bearings on the adjustable slide, whereby the tooth-block is rendered vertically adjustable, as set forth.

5. In a gear-molding machine, the combination of the arm D, screw-shaft P, and slide K, carrying the tooth-forming devices, with the bifurcated arm A′, adjustably connected to arm D, and adapted to straddle the tooth-block, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PETER L. SIMPSON.

Witnesses:
DONALD FRASER,
J. W. BROWN, Jr.