

(No Model.)

E. L. TARBOX.

PROCESS OF MOLDING TYPE WHEELS AND OTHER CURVED SURFACES.

No. 399,945.

Patented Mar. 19, 1889.

Fig. 1.

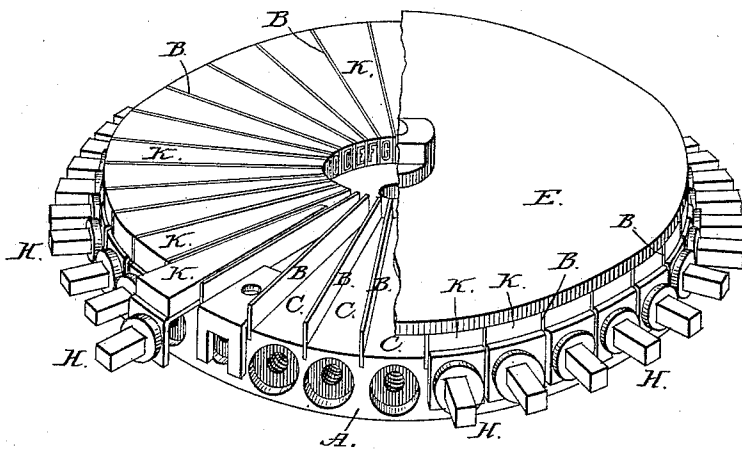


Fig. 2.

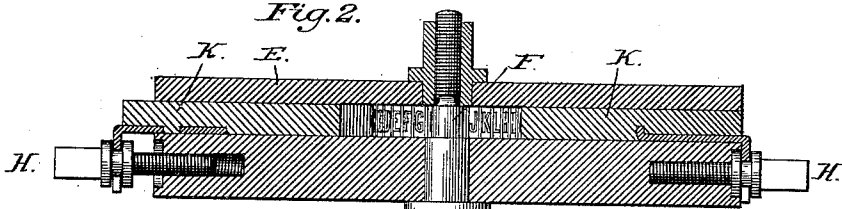


Fig. 3.

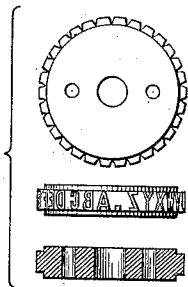
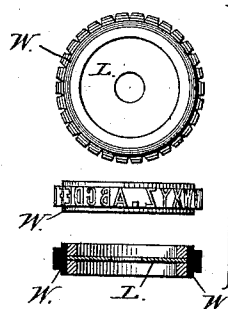


Fig. 4.



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EUGENE L. TARBOX, OF BROOKLYN, ASSIGNOR TO THE NEW YORK STENCIL WORKS, OF NEW YORK, N. Y.

PROCESS OF MOLDING TYPE-WHEELS AND OTHER CURVED SURFACES.

SPECIFICATION forming part of Letters Patent No. 399,945, dated March 19, 1889.

Application filed November 16, 1886. Serial No. 219,014. (No model.)

To all whom it may concern:

Be it known that I, EUGENE L. TARBOX, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in the Process of Manufacturing or Duplicating Type-Wheels and Similar Curved Objects and a Novel Type-Wheel Produced Thereby; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is an elevation in perspective of an improved segmental mold adapted to facilitate the manufacture of a type-wheel by my improved process. The mold is represented with one-half of its covering-plate broken away to disclose the radial segmental divisions beneath it. A portion of these divisions is shown as empty, one of them with a retracting-plate fitted in position on its outer edge, and the remainder as fitted each with a segmental block of type-metal whose outer end rests upon a retracting-plate, which is engaged by a set-screw to facilitate its withdrawal and adjustment. Fig. 2 is a diametric section of Fig. 1, showing one of the type-blocks in the mold partly withdrawn; Fig. 3, a plan, side elevation, and diametric section of a pattern type-wheel for duplication by my improved process; and Fig. 4, a similar plan, side elevation, and diametric section of a novel form of type-wheel produced in the matrix obtained from the original pattern type-wheel shown in Fig. 3.

Similar letters indicate like parts in all the figures.

My invention relates to an improved process for manufacturing or duplicating type-wheels and similar curved objects having devices thereon in relief or intaglio.

Where it has been required to produce characters upon the periphery of a wheel or other circular object in very deep relief it has been found necessary to carve or cut out the same by hand—a slow and expensive process.

It has been sought to improve upon the cutting of the type by hand and to produce a metallic type-bearing annulus by causing, with the aid of suitable mechanical devices, a

radial enlargement or expansion of the metal of the ring against dies fitted to encircle it; but the attempt has failed because of the impracticability of thus expanding metal of proper hardness and temper for use as type, and because of the expense attending such a process of manufacture. It has also been sought to obtain the desired end by encircling the rim of the wheel with a detached band bearing the type; but this has failed practically because of the difficulty in uniting the ends of the bands upon different wheels, so that any two of them shall be exact duplicates.

The object of my invention is to produce in duplicate from a given pattern type-wheels and similar circular devices having an endless or seamless face and the finish and sharpness of outline of the original type-wheel cut by hand, together with such degree of hardness as may be found desirable therein. I accomplish this result by the use of the novel means hereinafter described; and my invention consists in forming in any suitable manner a series of independent radial compartments about the curved surface of a suitable pattern-wheel, so that said curved surface shall constitute the inner wall of the several cells, filling said compartments with molten metal or other suitable material which will admit of being introduced thereinto in a fluid or semi-fluid condition and of hardening therein, allowing the material to harden in each compartment to form an angular segmental block therein whose inner face shall be a counterpart of the opposite face of the pattern, withdrawing radially in each compartment the block so formed therein out from the face of the pattern far enough to clear it, removing the pattern, returning the blocks to their first position, casting in the recess from which the pattern has been removed any desired character or quality of material, which will thereupon receive in the matrix formed by the combined segmental blocks the impression of the original pattern, so as to be an exact duplicate thereof, and, finally, by an outward radial movement of the several blocks, releasing said duplicate to permit of its withdrawal. By placing a previously-formed hub or foundation-piece within the

recess left vacant by the withdrawal of the pattern in such manner as to leave a space between said foundation-piece and the faces of the radial blocks a continuous facing may be formed thereon, which shall be a duplicate of the outer surface of the pattern.

The accompanying drawings illustrate the means which I preferably employ to effectuate my process, and which are shown as used for the manufacture of duplicate type-wheels having each a central hub made independent of the type-bearing annulus, which is subsequently formed thereon and united thereto.

A in said drawings represents a suitable bed-plate, from which projects a central pin or spindle, F. Upon this spindle is placed the complete pattern type-wheel to be duplicated.

A series of thin radial partition-plates, B B, are fixed upon the bed-plate to abut at their inner ends against the periphery of the pattern-wheel and between the several type or other designs produced in relief thereon. These partition-plates serve to constitute the side walls for a series of radial cells or compartments, C C, of which the peripheral surface of the pattern becomes the inner wall. Being of uniform height, coinciding with the depth or thickness of the pattern, a covering-plate, E, placed upon the pattern to extend to the outer ends of these plates B B, will serve to close the cells, leaving their outer ends alone open. When this covering-plate E is made fast, a suitable metallic alloy—such as type-metal—brought to a fluid or semi-fluid condition by heat, or a suitable plastic composition which shall speedily harden, is poured into the outer end of each cell, so as to become molded therein and a counterpart of so much of the periphery of the pattern-wheel as is embraced by the inner end of the cell is produced at its inner end. When the composition thus cast in the cells has hardened, the resulting mold-blocks K K are withdrawn radially far enough to fully disengage their inner ends from the pattern. This movement thereof is facilitated by means of adjusting-screws H H, working in the edge of the base-plate and engaging sliding plates to which the blocks are made to attach themselves by lugs or offsets. The pattern is then removed from its seat and the radial mold-blocks K K are moved inward to their original positions, so that their inner ends will form a matrix the exact counterpart of the periphery of the pattern and of which the bed-plate A serves as the bottom plate. Within this matrix and upon the central spindle, F, a hub or spider, L, is placed, having a rim of smaller diameter than the recess, but of equal depth or width, whereby an annular space is left between the rim and the inner periphery of the mold. This annular space is then filled with plastic rubber or celluloid or with a molten alloy or other suitable composition or compound adapted to constitute the face of the finished wheel, the

top of the recess being covered and inclosed by the covering-plate E. Where rubber or celluloid is used for the wheel, the compound, after being placed in the mold to fill it completely, is hardened by subjecting the closed mold to heat in the customary manner. If a molten alloy be used, the mold is allowed to cool until the alloy has hardened. The radial mold-blocks K K are now again withdrawn to permit the withdrawal of the type-wheel (see Fig. 4 of the drawings) which has been produced, as described, in the mold.

By this process a wheel is readily produced having a metallic hub or body encircled by an unbroken or solid seamless peripheral band of rubber or celluloid firmly united thereto and bearing type or other characters duplicating exactly those in the pattern-wheel.

If preferred, the use of a previously-formed central hub or spider, L, may be dispensed with and the entire wheel (see Fig. 3 of the drawings) be formed or cast in the mold whose periphery is formed by the inner ends of the radial blocks K K. In either case the periphery of the molded wheel will be an exact duplicate of the original pattern. As the mold obtained as described is not injured by use, it may be employed to produce in the manner set forth any number of duplicates of the pattern.

It is evident that my process of producing duplicates of a type-wheel by forming radial cells about its curved surface, casting mold-blocks in said cells, withdrawing the blocks to disengage the pattern, returning them to their original positions to form a matrix, and, finally, casting the duplicate wheel in said matrix, may be applied to the reproduction of all manner of curved surfaces bearing characters or designs thereon in simple relief or intaglio.

I claim as my invention—

1. The process, substantially as described, of manufacturing a type-wheel or other object having a curved surface bearing characters thereon in relief or intaglio, which consists in filling a series of radial cells formed about the curved or circular surface of a suitable pattern with a plastic composition or molten alloy adapted to conform to the type or other characters on the surface of the pattern, allowing the composition or alloy to harden into blocks in contact with the pattern, so as to retain the impression thereof, withdrawing radially within their cells these sectional mold-blocks far enough to disengage them from the pattern, removing the pattern from between the blocks, moving back the radial mold-blocks to their original positions, casting the material for the finished object in the matrix or recess previously occupied by the pattern, and finally again withdrawing the mold-blocks radially to disengage them from the casting.

2. The process, substantially as described, of manufacturing a type-wheel or other object having a curved surface bearing charac-

ters thereon in relief or intaglio, which consists in filling a series of radial cells formed about the circular or curved surface of a suitable pattern with a plastic composition or a molten alloy adapted to conform to the type or other characters on the said surface of the pattern, allowing the composition or alloy to harden into blocks in contact with the pattern, so as to retain the impression thereof, withdrawing radially within their cells these sectional mold-blocks far enough to disengage them from the pattern, removing the pattern from between the blocks, moving back the radial mold-blocks to their original positions, placing a previously-formed hub or body-piece of smaller diameter than the pattern centrally in the recess encircled by the radial mold-

blocks, filling the space between the hub or body-piece and the encircling mold-blocks with rubber, celluloid, or other equivalent plastic compound, subjecting the same to heat to harden the compound, and finally withdrawing the mold-blocks radially from the periphery of the compound device thus produced to permit of its withdrawal from the mold.

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

EUGENE L. TARBOX.

Witnesses:

S. A. STAVERS,
S. M. MADDEN.