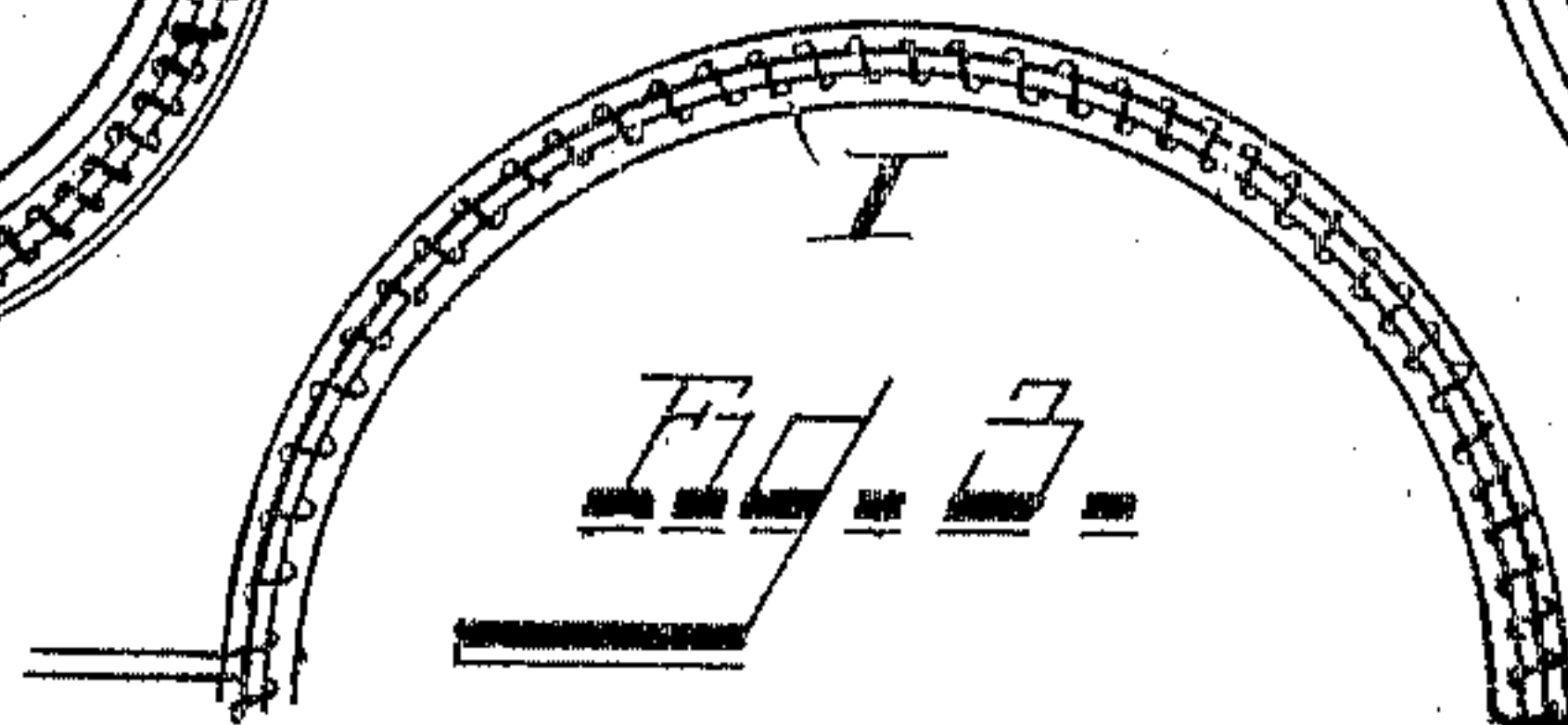
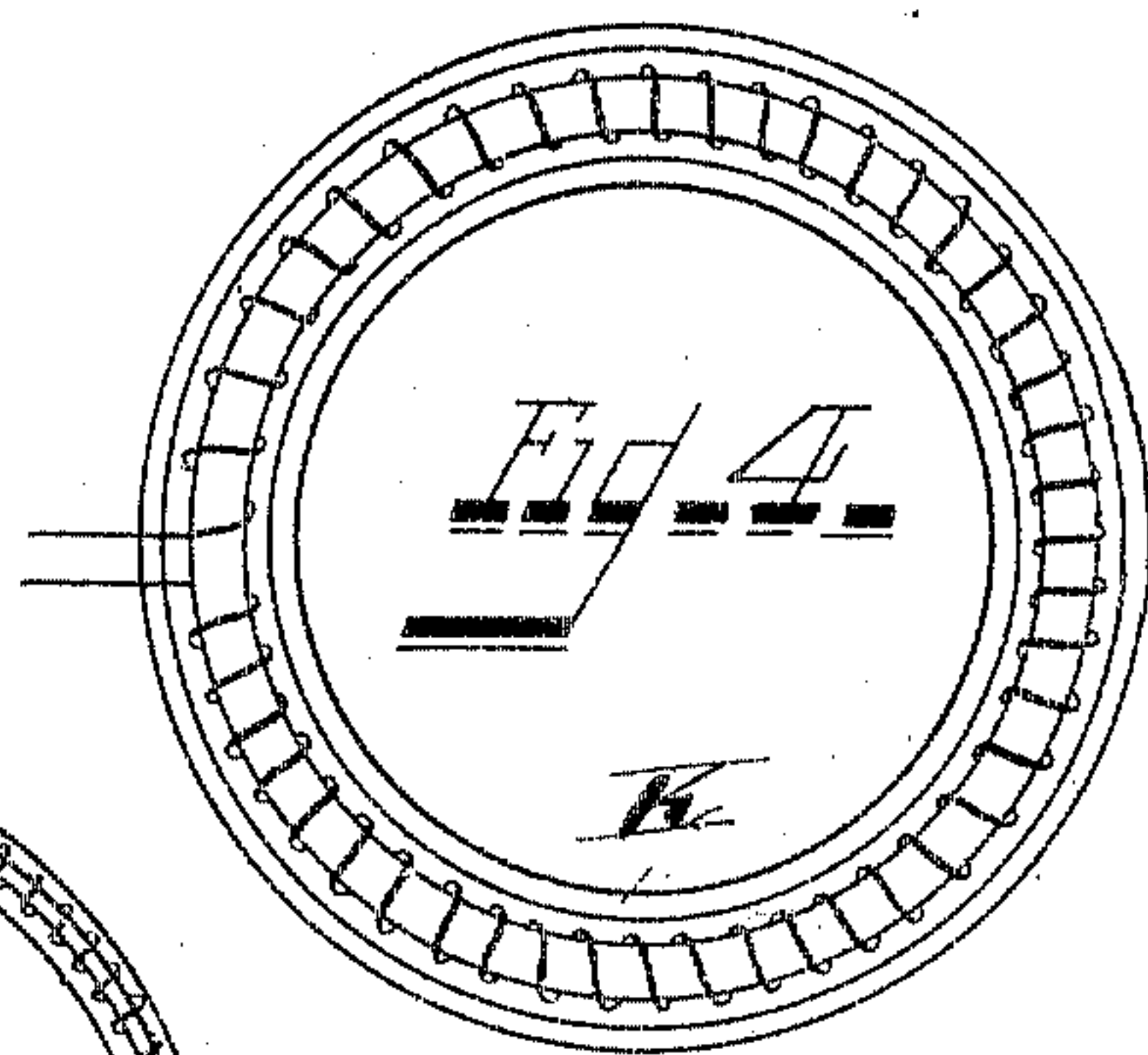
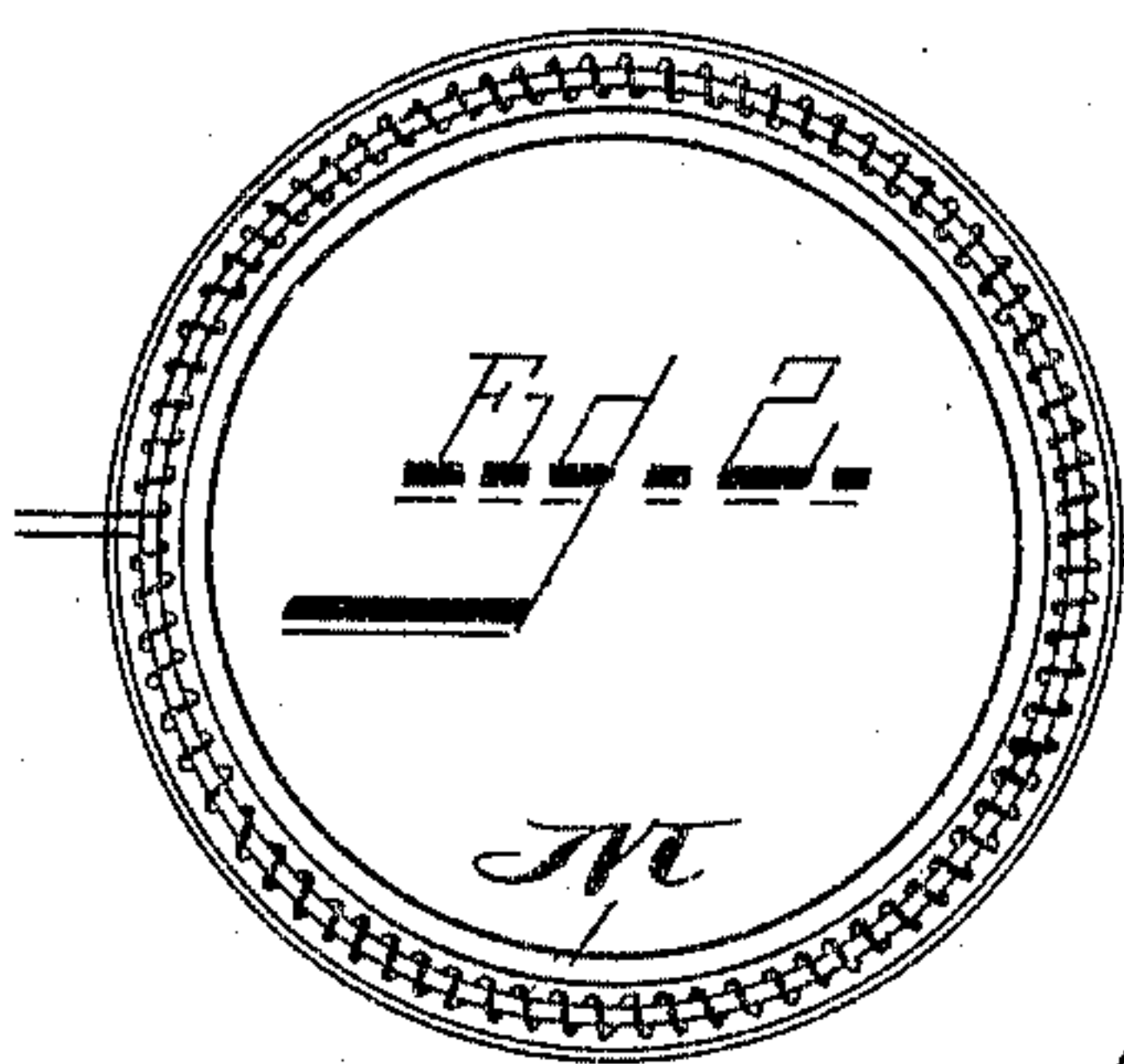
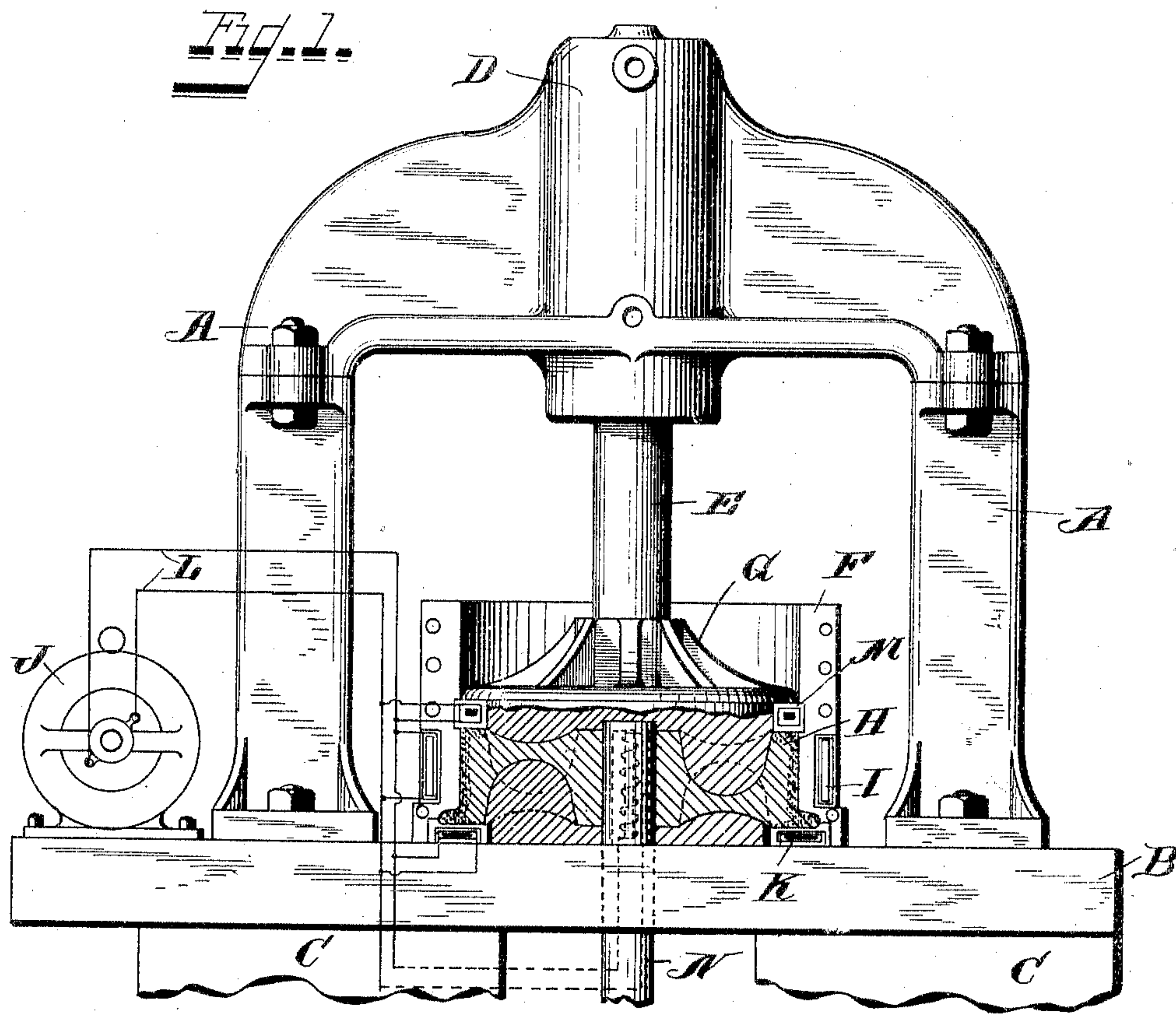


No. 777,338.

PATENTED DEC. 13, 1904.

J. H. FORBES.  
METAL CASTING PROCESS.  
APPLICATION FILED OCT. 5, 1903.

NO MODEL.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN H. FORBES, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-SIXTEENTH  
TO JAMES N. RAMSEY, OF CINCINNATI, OHIO.

## METAL-CASTING PROCESS.

SPECIFICATION forming part of Letters Patent No. 777,338, dated December 13, 1904.

Application filed October 5, 1903. Serial No. 175,756. (No specimens.)

*To all whom it may concern:*

Be it known that I, JOHN H. FORBES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Metal-Casting Processes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a process for making metal castings wherein it is desired to produce a homogeneous casting and to combine with said casting at certain points certain qualities of metal which will make the resultant casting much more suited for the work in which it is to be employed than is possible with any method now in use; and it has for its object the provision of simple and efficient means whereby such results may be accomplished.

The novelty of my invention will be hereinafter more fully set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine adapted to carry out my invention. Figs. 2, 3, and 4 are diagrammatic views showing the winding of the electromagnets employed in carrying out my invention.

The same letters of reference are used to indicate identical parts in all the figures.

A represents any suitable hydraulic or other press secured in any suitable manner upon a bed-plate B, resting on foundations C. The press shown in the drawings has one water-cylinder D, into which is fitted the piston-rod E, carrying any suitable form of piston, (not shown;) but the number of water-cylinders B and pistons E forms no part of my invention and may be varied to suit the user.

Suitably mounted upon the bed-plate B between the uprights of the press A is a mold F, into which the molten metal to form the casting is poured, and this mold I prefer to make of iron in some cases and of sand in others. The bottom and top of the mold may be either of iron or sand, as preferred; but it will be found more convenient to make them

of iron, and where the casting is to have a hole through it a core may be introduced, as in ordinary casting. The top of the mold may be either formed integral with or separate from the presser G, secured to the lower end of the piston-rod E. In the drawings all of the parts of the mold are shown as being made of metal and in the shape for casting a car-wheel, the car-wheel casting being shown in the mold at H. The essential feature of my invention, however, does not reside in that part of the mechanism already described, but is contained in my ability to make an iron casting with a steel facing on any part thereof, and this I do in the following manner: Surrounding the tread of the car-wheel is an electromagnetic ring I, Figs. 1 and 3, the electricity for which being supplied by any suitable generator J through feed-wires L. A ring K, Figs. 1 and 4, constituting an electromagnet similar to the magnet I, is placed in the bottom of the mold, as shown, and connected to the feed-wires L of the generator J, and a third ring M is placed at the top of the casting H and is similar in construction to both rings I and K and is likewise fed by the generator J. It will be readily seen that when the electromagnets I, K, and M are energized a strong magnetic flow will be set up, which I utilize in the following manner: While the magnetic flow is in progress I line the magnetized walls of the mold with the quality of metal which I desire to have upon the face of the casting when completed, and this metal may be composed of steel borings, turnings, filings, or other small particles of steel or other composition which I wish to incorporate into the casting, and, if desired, a steel-wire net or gauze may be inserted to assist in retaining the smaller particles of metal in position. The body of the casting is then poured of ordinary gray iron, and pressure is applied by the press A to form the whole casting into a very close-grained homogeneous mass. After the metal has set the magnets may be deenergized and the casting removed from the mold, when it will be found to have a smooth even surface and a fine texture.

The object of magnetizing a portion of the



mold during the process of casting is to retain the particles of metal of extra quality in their proper position near the surface, and the heat of the molten metal in the body of the casting will fuse these particles of metal into a solid mass, which will also combine with the iron, as will be readily understood.

In casting loose pulleys, sheaves, idlers, gear-blanks, or, in fact, anything intended to have a bearing internally it is only necessary to omit the magnet-rings I, K, and M and magnetize the core N, as shown by the dotted line, Fig. 1, and connect it, as shown by the dotted wires, to the feed-wires L of the generator J. The core may then be surrounded by the extra quality of metal in the same manner as the rim of the car-wheel mold was surrounded in the description above, and the resultant casting will be provided with a lining similar to the facing of the car-wheel described above, or, if desired, any other part of the casting may be treated in a similar way, as will be readily understood, it being of course understood that for each different size or shape of

casting a corresponding size and shape of mold must be constructed.

Having thus fully described my invention, I claim—

1. A process for casting metal consisting in first magnetizing a portion of the mold, then applying to such magnetized parts an extra quality of metal to be incorporated in the casting, then pouring molten metal into the mold to form the body of the casting.

2. A process for casting metal consisting in first magnetizing a portion of the mold, then applying to such magnetized parts an extra quality of metal to be incorporated in the casting, then pouring the molten metal into the mold to form the body of the casting, then subjecting the same to pressure for the purpose of forming the casting into a homogeneous mass.

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