

No. 826,650.

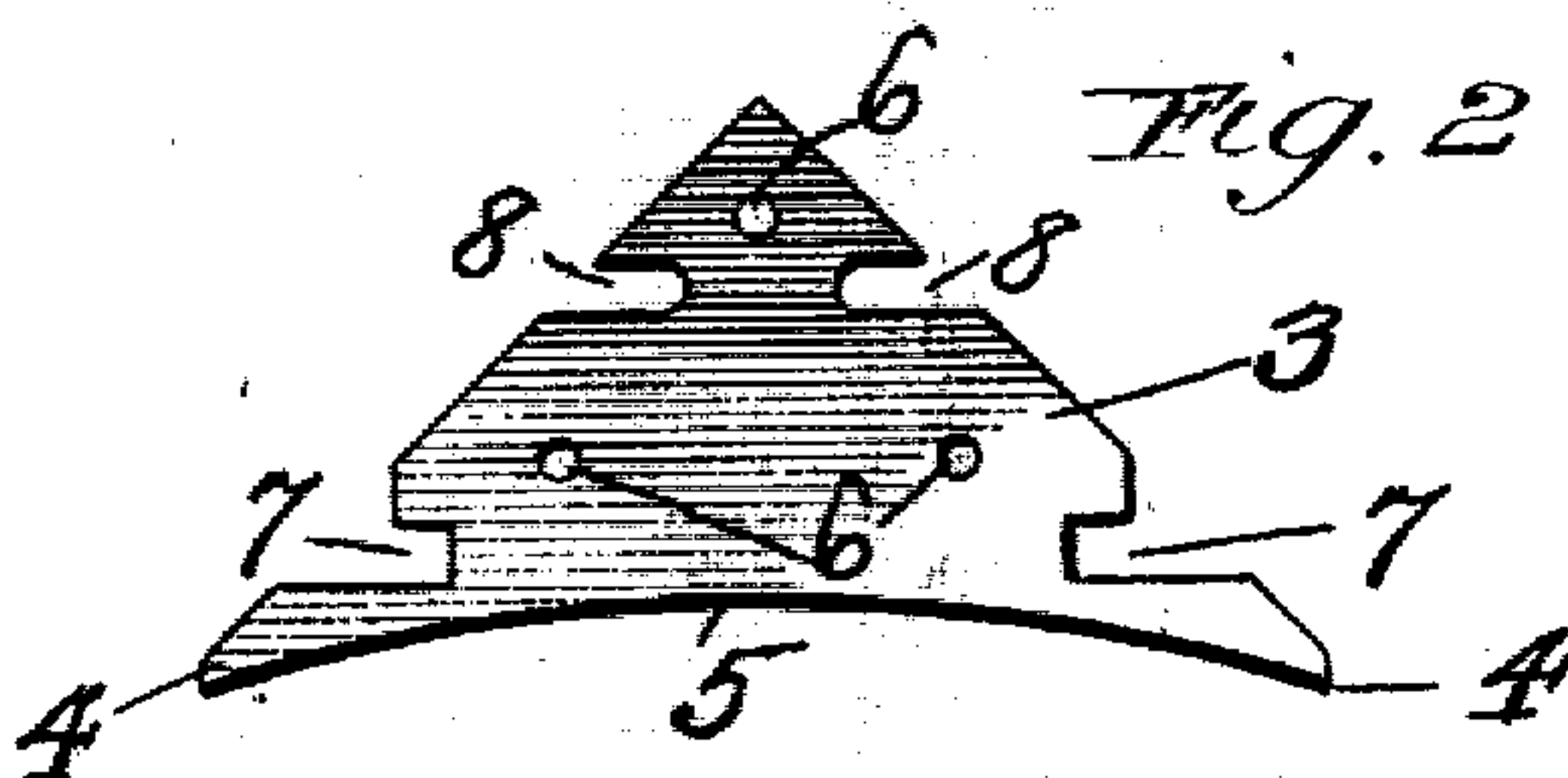
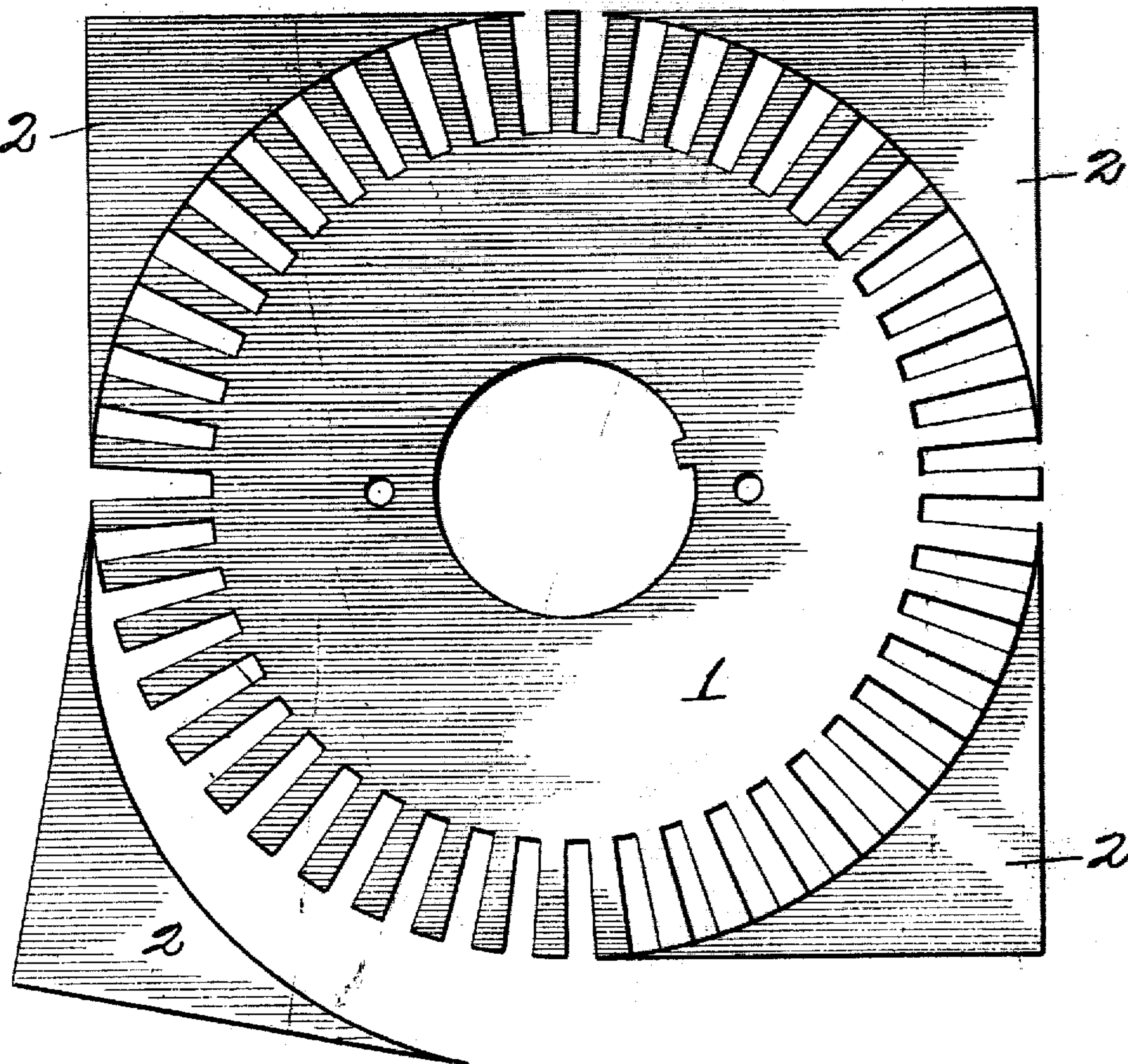
PATENTED JULY 24, 1906.

N. A. CHRISTENSEN.
POLE PIECE FOR ELECTRIC MACHINES.

APPLICATION FILED APR. 11, 1901.

2 SHEETS—SHEET 1.

Fig. 1



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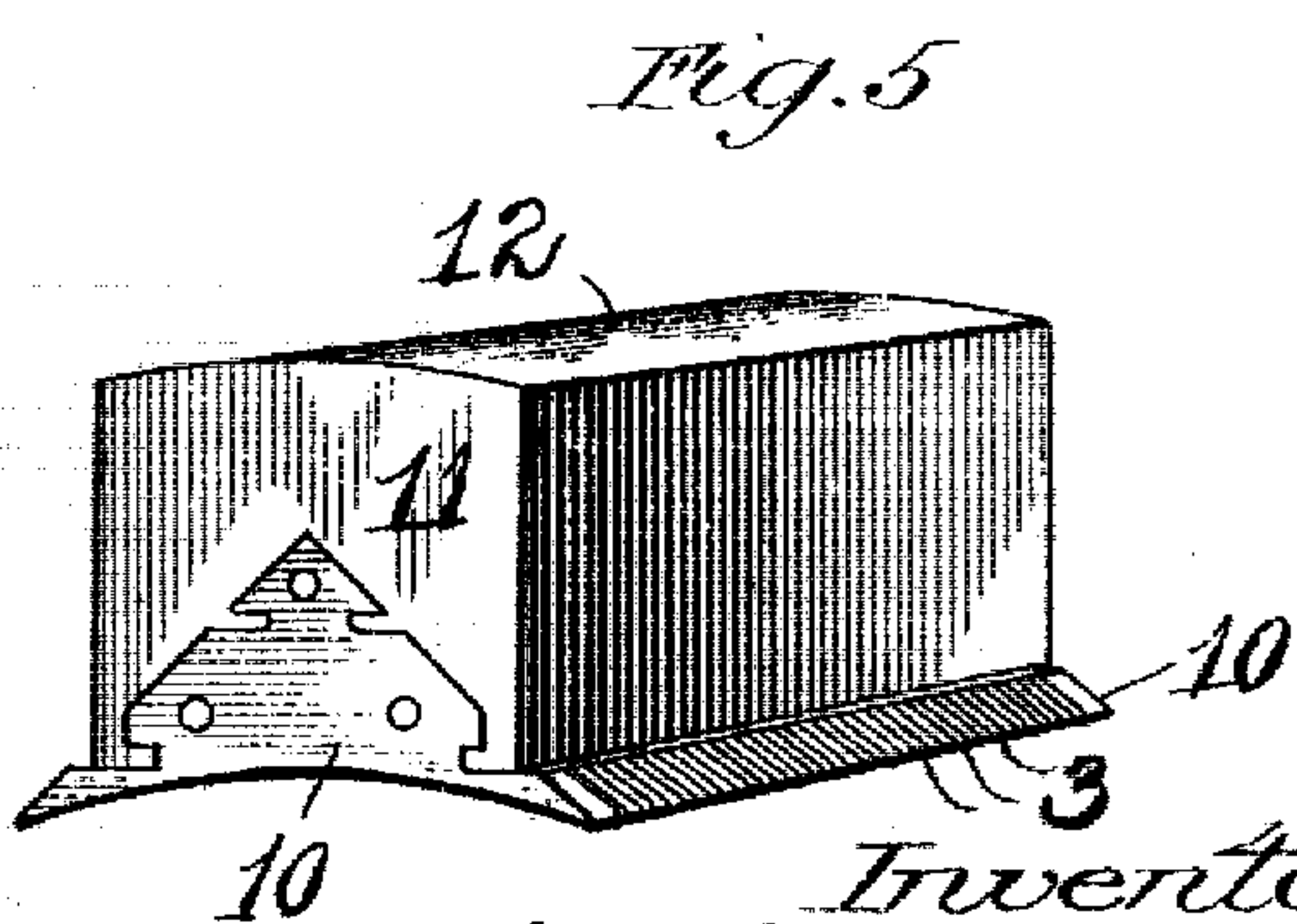
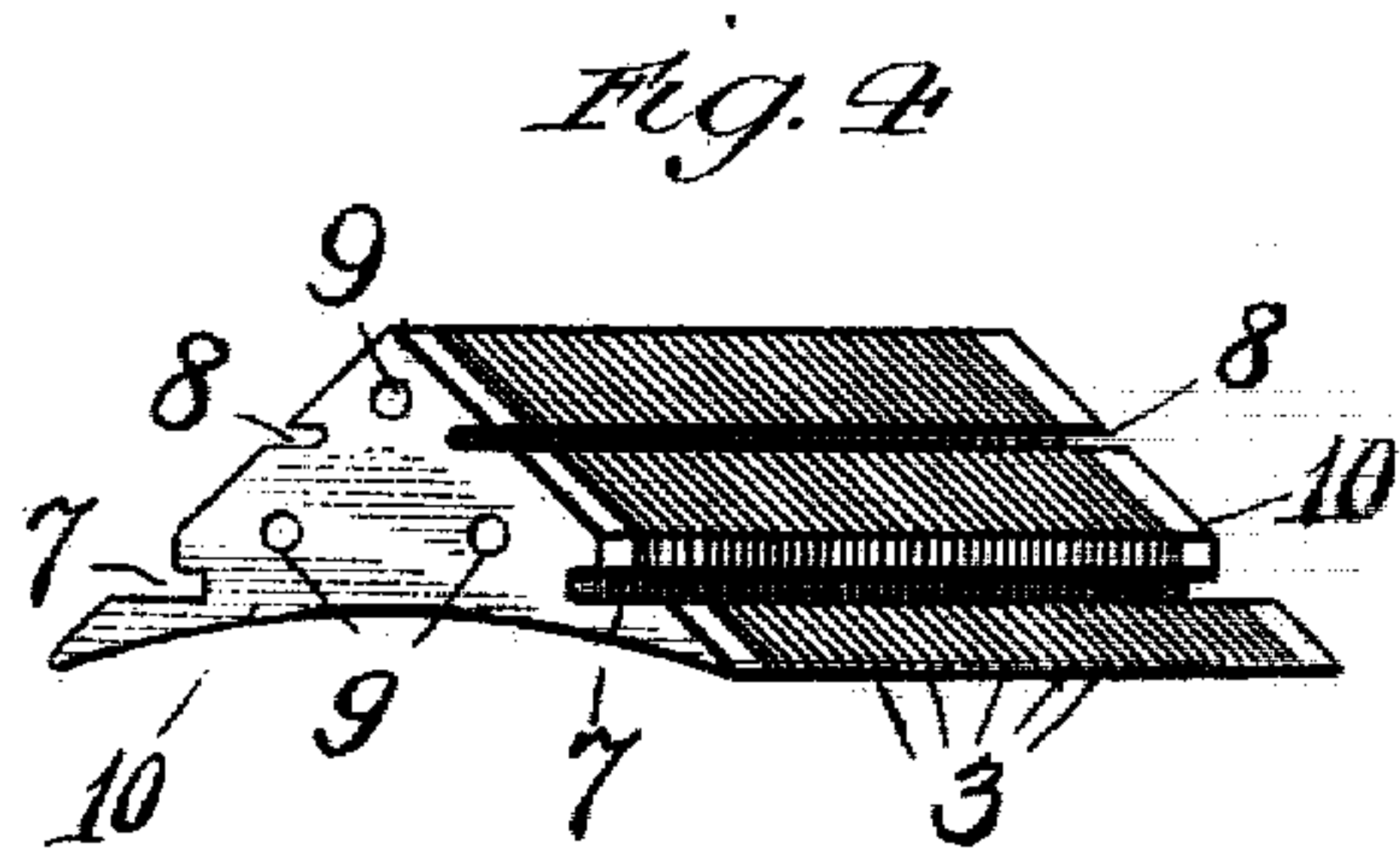
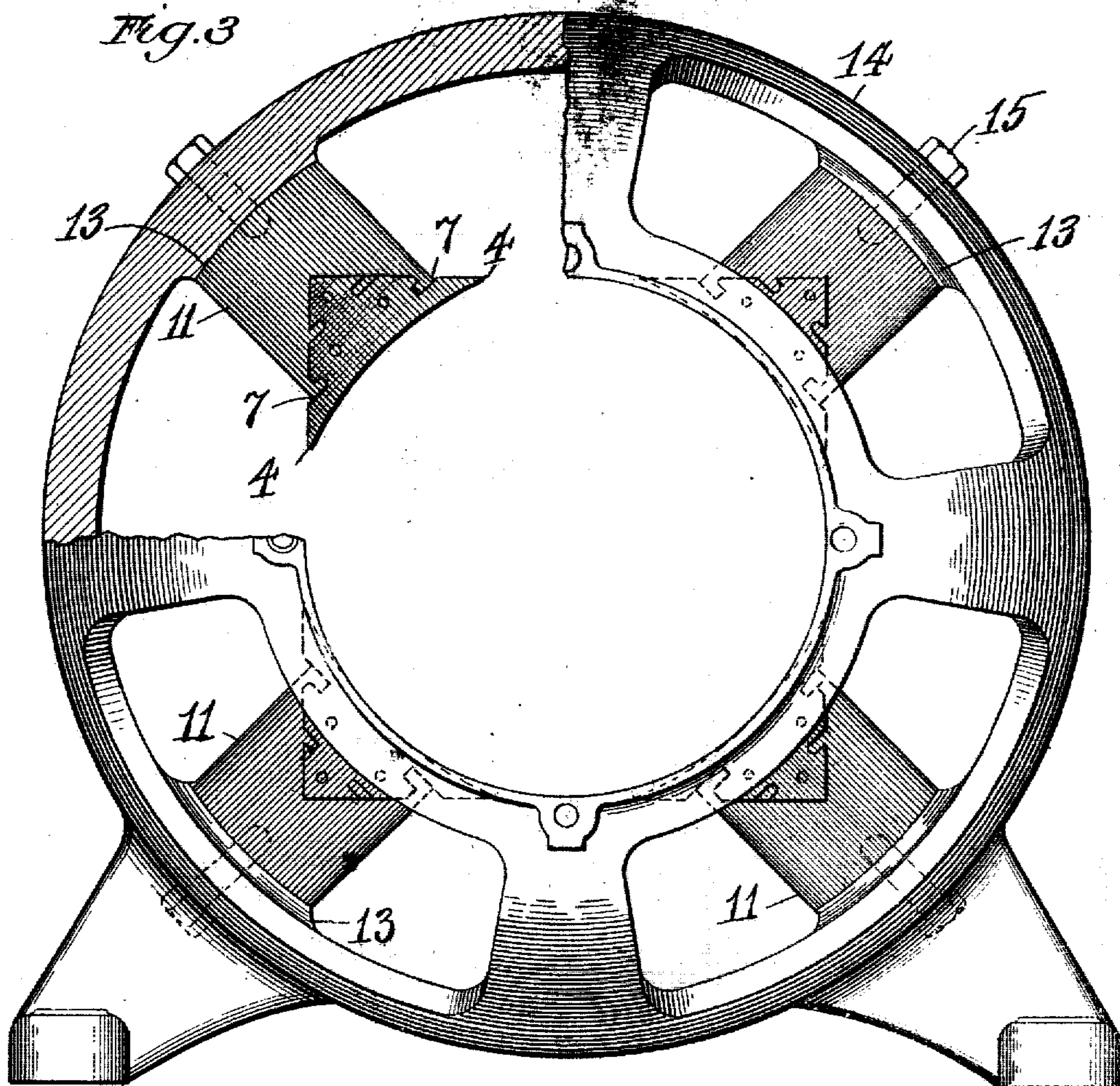
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

NIELS ANTON CHRISTENSEN, OF MILWAUKEE, WISCONSIN.

POLE-PIECE FOR ELECTRIC MACHINES.

No. 826,650.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed April 11, 1901. Serial No. 55,389.

To all whom it may concern:

Be it known that I, NIELS ANTON CHRISTENSEN, residing at Milwaukee, Milwaukee county, Wisconsin, have invented certain new and useful Improvements in Pole-Pieces for Electric Machines and Methods of Making the Same, of which the following is a specification.

My invention consists in the production of a new pole-piece for electric machines and in the process or method of making the same. In general terms the new pole-piece, either separate from or integral with the field-frame, consists of a series of pieces or plates of sheet metal forming a laminated pole-face and on which is cast the body portion of the pole-piece either alone where the pole-piece is to be made separate or detachable from the field-frame or together with such frame when the pole-piece is to be made integral therewith. The resulting pole-piece, therefore, has a laminated pole-face and a homogeneous back or body portion—that is, it is partly laminated and partly homogeneous.

In making armature-disks for electric machines of my manufacture the corners of the sheet metal have heretofore been thrown away as scrap; but I have found that they may be utilized in the making of a laminated pole-face whereby practically all of the metal is utilized either for the armature-disks or for the pole-pieces. It is preferred to use this scrap as a matter of economy, although obviously special and first-hand sheet metal may be used.

In the drawings, Figure 1 is a plan of a sheet of metal out of which has been stamped an armature-disk, leaving four corners; Fig. 2, a plan of one of said corners after being stamped or cut to constitute one of the plates for the laminated pole-face; Fig. 3, an end elevation, partly in section, of the frame of an electric machine, showing my new pole-pieces; Fig. 4, a perspective of the laminated portion or pole-face of my pole, and Fig. 5 a perspective of the complete pole-piece when my invention is embodied in a pole-piece of the removable or detachable type.

When an armature-disk 1 is punched or cut out from the sheet metal, the corners 2 remain, which, as above stated, have usually been considered as scrap. Each corner is now cut by a suitable die to form the plate 3, with the pole-tips 4 diverging slightly tangentially, as usual, with respect to the curved

face 5 thereof. The plate is preferably provided with a suitable number of holes 6 to receive rivets, as hereinafter described, and also provided with suitable notches or recesses 7 and 8 in the sides thereof to assure proper anchorage for the cast metal, as hereinafter specified. Obviously a compound die instead of two single dies may be used to cut out the armature-disks and the plates 3 at a single operation. Each plate may be of any desired dimensions and of any desired shape as to its rear portion or face. A series of these pole-plates of a number to make the proper size of pole-piece are now bunched and bound together by rivets 9, passing through the holes 6, end binding-plates 10 of suitable thickness being preferably employed. The pole-face—that is, the inside surface toward the armature—is completely finished without the need of any further machinery, the plates or laminations having been punched and trimmed, so as to be of an exact circle at the central portion, with the pole-tips diverging slightly tangentially from the circle.

The work above described is that usually done in a machine-shop, and the completed and assembled bunch of pole-plates is now taken to the foundry, and when it is desired to make the pole-piece of the removable type said plates are properly set in the mold and a homogeneous body portion or block 11 is cast onto the back or rear side of the pole-plates, after which the resulting pole-piece is taken back to the machine-shop and its outer face 12 finished or machined, so as to accurately fit upon the usual pad 13 on the interior wall of the field-frame 14 of an electric machine, as seen in Fig. 3, the pole-piece being secured in the usual way by bolts 15. When, however, the pole-piece is to be of that solid class integral with the field-frame, the requisite number of sets of bunched plates is placed in the mold for the field-frame and poles, and the frame and the blocks or rear ends of the pole-pieces are then cast, such ends of the pole-pieces being cast directly upon said plates. Whether the pole-pieces are thus made separately or integral with the field-frame, it may be said that blocks or backs are cast upon the plates. The completed pole-piece thus becomes an integral structure composed of a homogeneous block or body portion and a laminated portion or pole-face, the former being cast directly upon the latter portion, which when

said scrap is used, as herein suggested, is of substantially triangular shape in cross-section. When the block or body portion is thus cast onto these plates, the metal runs
 5 into the notches 7 and 8, and thereby secures firm anchorage thereon, whereby a practically integral pole-piece results. While the sides of the bunched plates may be sufficiently rough of themselves for the purpose,
 10 yet it is desirable and preferable to employ notches specially provided.

Although my invention is shown embodied in a pole-piece of the removable or detachable type, yet it is obvious from the
 15 foregoing description that it is not to be limited thereto; but, on the contrary, the same may be embodied in a pole-piece of the type solid or integral with the field-frame.

I claim—

20 1. An integral pole-piece formed as a separate structure and whose front face is laminated by means of plates bunched together in contact with each other, and whose back is a homogeneous block or body cast upon
 25 said plates and adapted to fit a field-frame.

2. An integral pole-piece formed as a separate structure, and having a laminated face consisting of like pieces of sheet-iron arranged contiguously and held in contact
 30 with each other, each of said pieces having a curved face and a square face or edge, and a homogeneous block or body portion of iron cast thereon, said block or body portion being cast upon the square edges or faces of
 35 said pieces of sheet-iron.

3. An integral pole-piece presented radially to an armature and whose front portion has a laminated face composed of a bunch of plates in contact with each other and
 40 whose rear portion is cast onto the front portion and is homogeneous in character said resulting structure being separate from the usual field-frame.

4. An integral pole-piece presented radially to an armature and having a laminated
 45 face composed of a bunch of sheet-metal plates contiguously arranged and having

notches on their rear or inner side and a back cast upon the plates and anchored in the notches, said completed pole-piece being an
 50 integral structure and separate from the usual field-frame.

5. A pole-piece comprising a laminated face composed of a bunch of plates arranged contiguously and in contact with each other
 55 and a back cast upon the rear end of such bunch of plates and separate from the usual field-frame.

6. An integral pole-piece comprising a laminated face composed of a bunch of
 60 plates arranged contiguously and in contact with each other, end binding-plates on said bunch of plates and a block cast onto the block of said plates, and forming the rear portion of such pole-piece which is separate
 65 from the usual field-frame.

7. A pole-piece composed of a series of substantially triangular pieces bunched and held together to form the pole-face and a substantially homogeneous back thereon.
 70

8. A pole-piece composed of a series of substantially triangular pieces or plates which are cut out from the scrap resulting from the cutting of armature-disks and each of which have the pole-face 5 and pole-tips 4 and a
 75 block cast on the back of the plates.

9. A removable pole-piece composed of a series of plates to form a laminated face and a homogeneous block cast onto the back of such plates and having its outer face 12 finished to fit a field-frame.
 80

10. A pole-piece composed of a series of substantially triangular pieces or plates, each of which have the pole-face 5, pole-tips 4, notches 7 and 8 and holes 6, end binding-
 85 plates 9 and rivets 10 passing through said holes 6 said plate being of less length than the completed pole-piece, and a block cast upon the back of said plates.

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Witnesses:

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