(No Model.) 3 Sheets—Sheet 1.

N. J. WINLUND.

CIRCULAR KNITTING MACHINE.

No. 451,286. Patented Apr. 28, 1891.

Fig. 1.

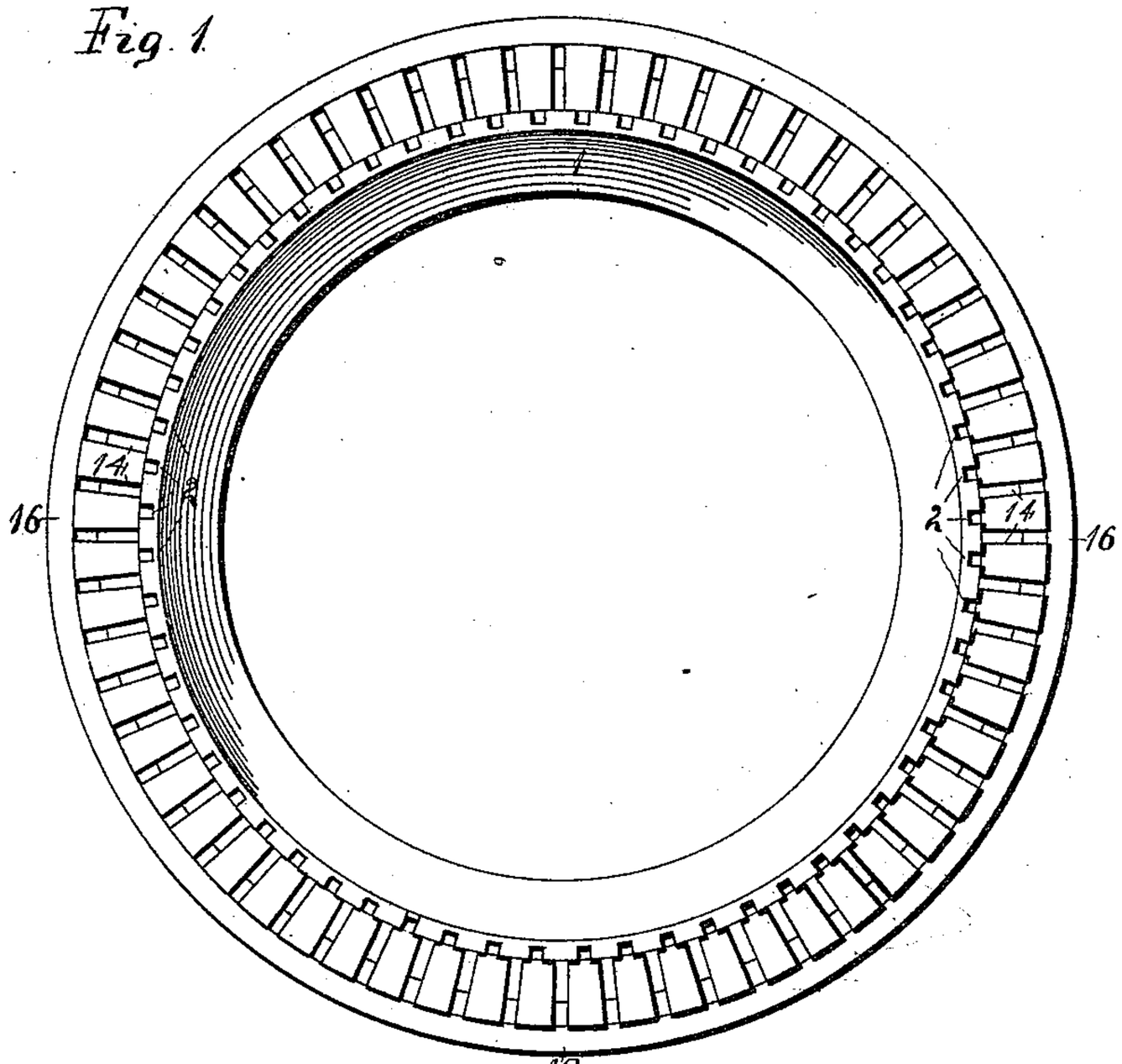
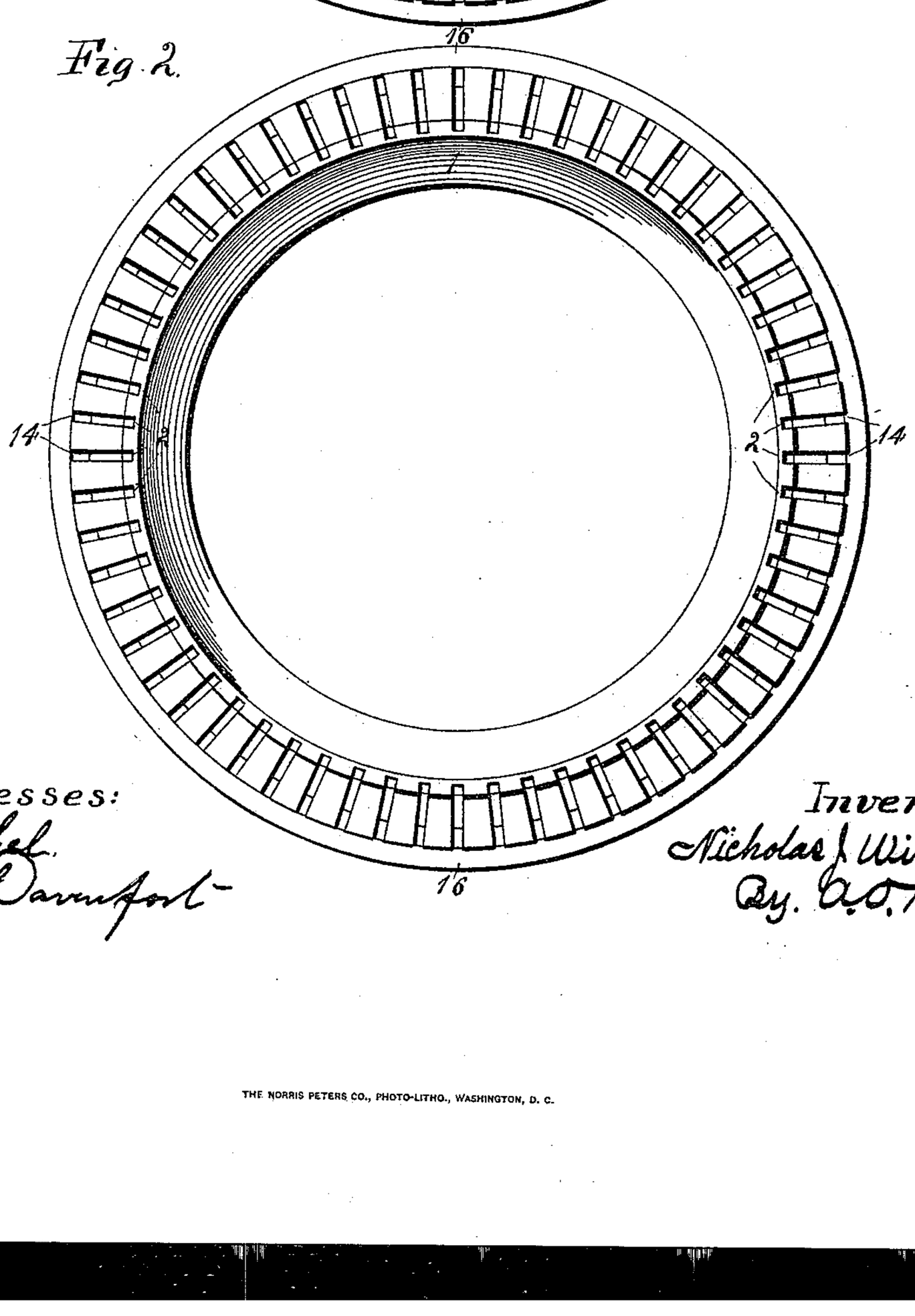


Fig. 2.



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3 Sheets—Sheet 2.

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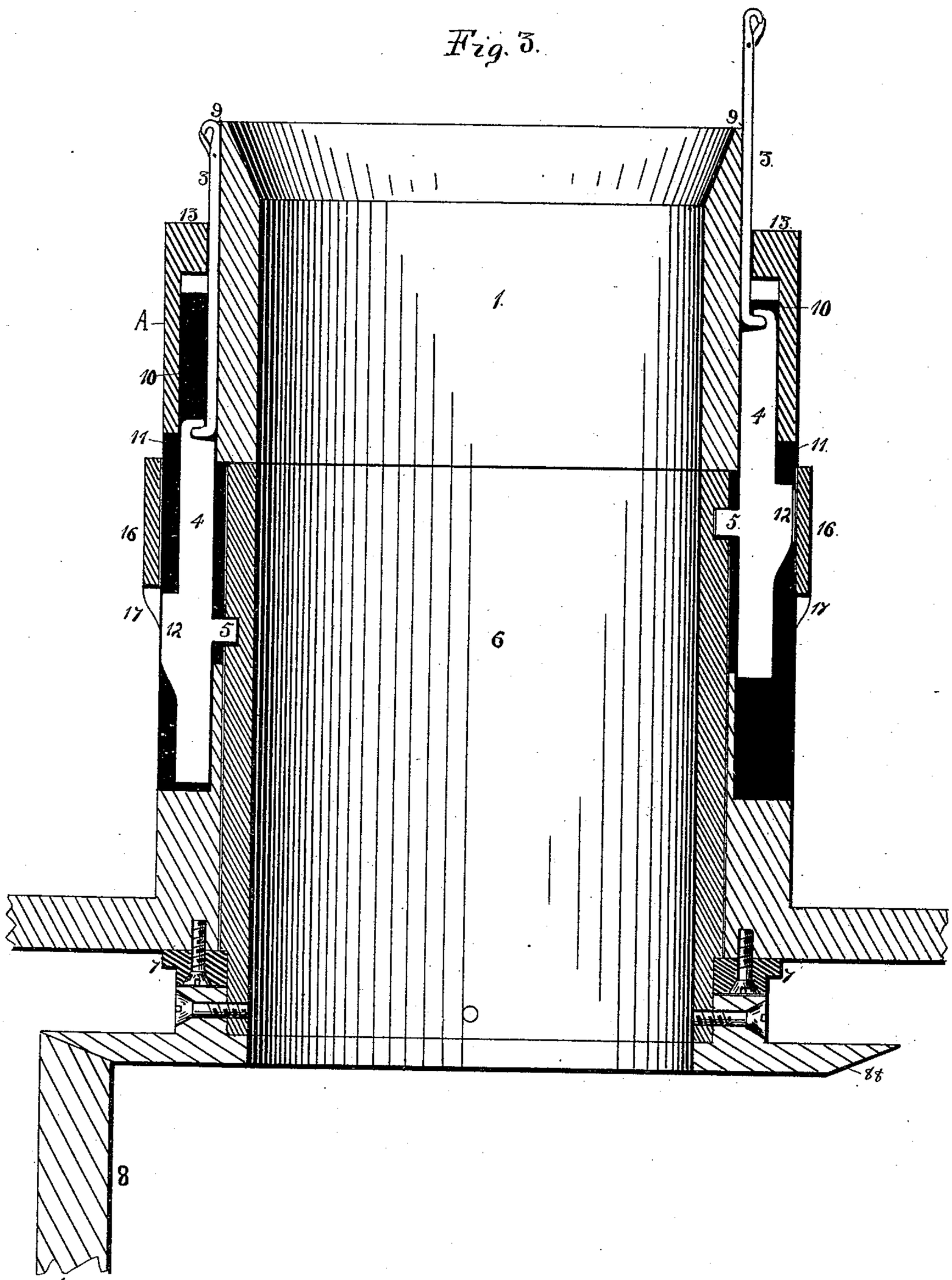
Fig. 3.



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CIRCULAR KNITTING MACHINE.

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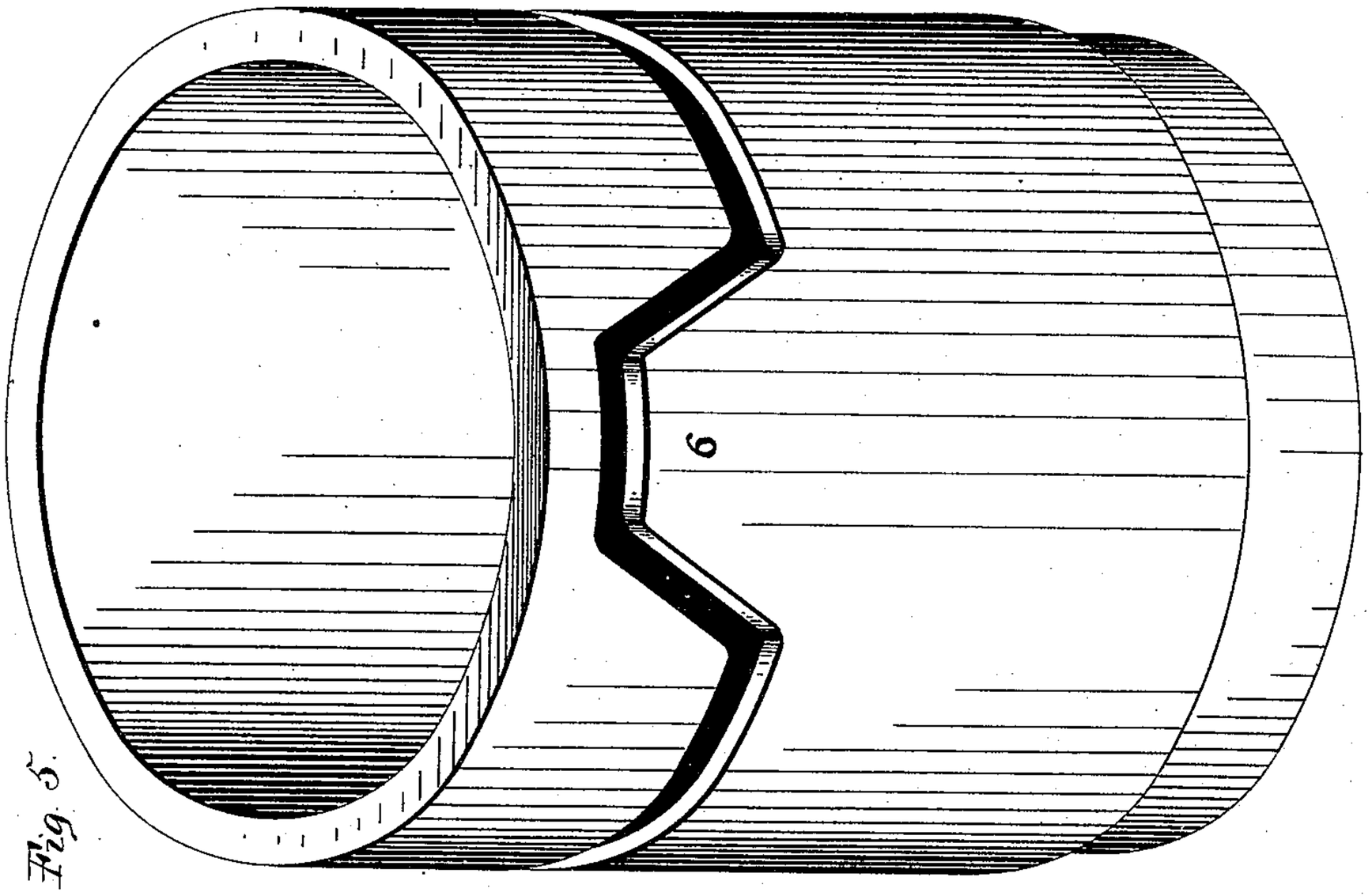

Fig. 5.

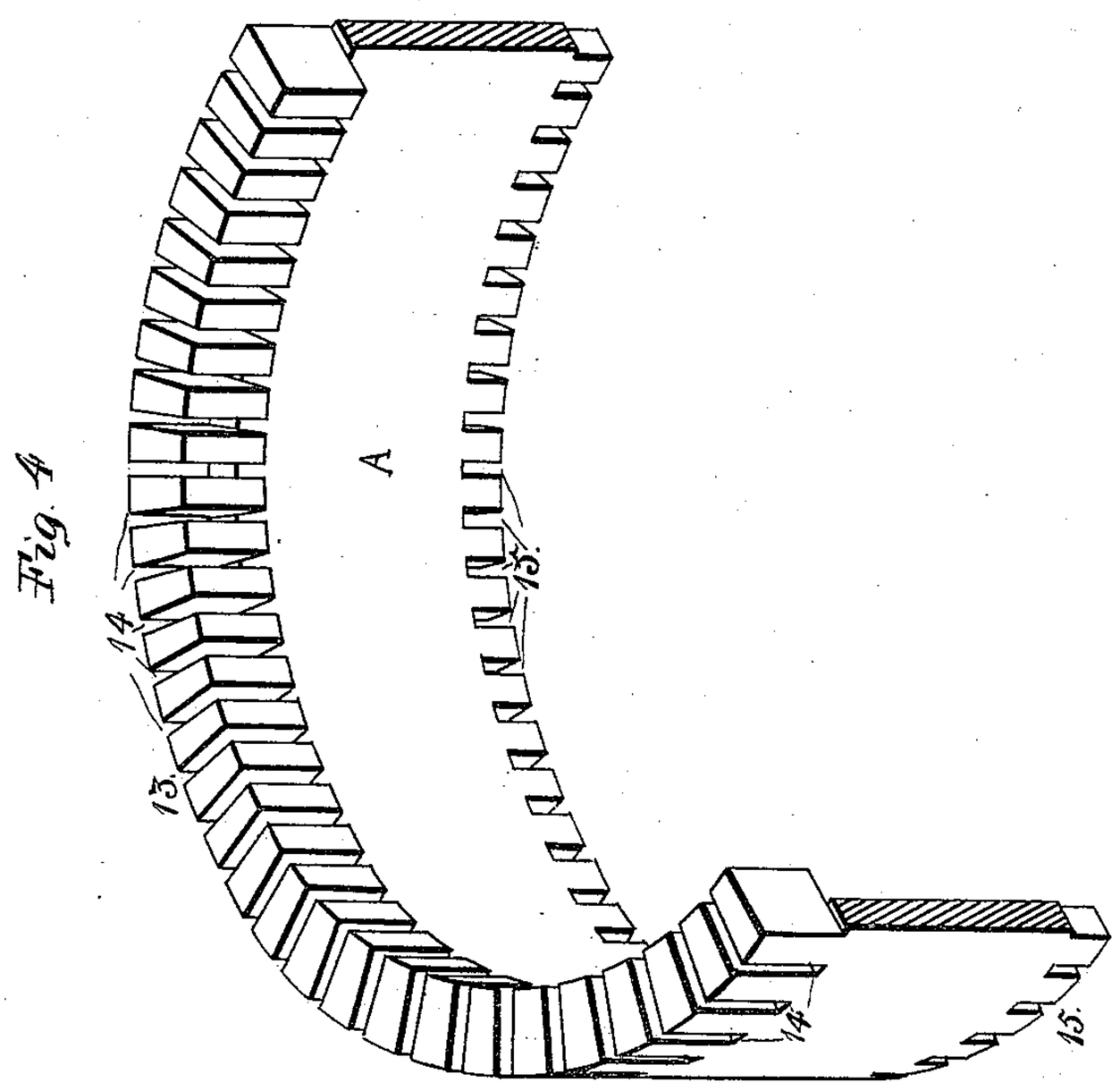

Fig. 4

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UNITED STATES PATENT OFFICE.

NICHOLAS J. WINLUND, OF ROCKFORD, ILLINOIS.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 451,286, dated April 28, 1891.

Application filed September 19, 1890. Serial No. 365,502. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS J. WINLUND, a subject of the King of Sweden, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Circular-Knitting Machines, of which the following is a specification.

The object of this invention is to apply to a circular-knitting machine devices for holding the needles in the grooves of the needle-cylinder during the process of knitting and at will to permit the removal of all or any one of the needles, and for holding the jacks in their respective grooves and permit the removal of the same.

In the accompanying drawings, Figure 1 is a plan of the needle-cylinder, showing the needle and jack releasing devices in position, preventing the removal of the needles and jacks. Fig. 2 is a plan of the needle-cylinder, showing the needle-retaining device turned in position to permit the removal of the needles. Fig. 3 is a vertical central section through the needle-cylinder, needle and jack retaining devices, and the cam for raising and lowering the needles. Fig. 4 is an isometrical representation of the needle-holding device shown in section. Fig. 5 is an isometrical representation of the cam employed for raising and lowering the needles.

The needle-cylinder 1 in this instance has its outer face provided with vertical needle-grooves 2. These grooves are deeper than is necessary for the needles 3 to play in, and form guideways for jacks 4, which are connected with the lower ends of the needles. The jacks have projections 5, which extend through vertical slots in the needle-cylinder and engage a cam-cylinder 6, placed within the central opening of the needle-cylinder. This cam-cylinder is formed with an annular groove in the outer face, a portion of which is irregular, so that when the irregular portion comes in contact with the projections on the jacks the jacks will be raised and lowered with the revolution or oscillation of the cam-cylinder. The cam-cylinder is held in its relation with the needle-cylinder by a collar 7, loosely fitting the reduced lower end of the cylinder, a bevel gear-wheel 88 being secured to the lower end of the cam-cylinder, the teeth of which mesh with the teeth of a bevel-pinion 8, from which motion is imparted to the cam-cylinder. As I raise and lower the needles from the inside of the needle-cylinder, I must provide means for holding the needles and their jacks in their respective grooves in the outer face of the needle-cylinder. This needle-cylinder has its grooves of different depths, the least depth, at 9, being sufficient to admit the needles, while the next depth, at 10, receives the main portion of the jacks, and the greatest depth 11 receives the projections 12 of the jacks.

The device A for holding the needles in position is of cylindrical form and has an enlarged upper end 13. The lower end of this cylinder rests upon the shoulder of the needle-cylinder at 11 and has its outer face flush with the largest diameter of the needle-cylinder. Its enlarged upper end fits the outside diameter of the needle-grooves. When the cylinder A is in position, its inner faces hold the needles and the upper ends of the jacks in position in their grooves and prevents them from falling out. This cylinder is provided with vertical slots 14 at its upper end and vertical slots 15 at its lower end, and when the cylinder is turned upon the needle-cylinder its slots will come in line with the grooves of the needle-cylinder, as shown at Fig. 2, and the needles can be drawn up and detached from their jacks and removed from the needle-cylinder, and can be replaced in a reverse manner, and when replaced the cylinder A is turned so that the portion between each two of its grooves will come opposite the groove of the needle-cylinder, thereby holding the needles in their grooves, as shown at Fig. 1.

A collar 16 slips over the needle-cylinder and rests upon ledges 17, which are a portion of the needle-cylinder. This collar when in position forms a guideway for the jacks and holds them in their grooves, and by removing the collar and bringing the grooves 15 of the cylinder which holds the needles in position to correspond with the jack-grooves the jacks can be readily removed and are held in working position when the collar is on the needle-cylinder.

By this construction of needle-holding device I am able to remove any one needle or jack without disturbing the remainder, or by

removing the cylinder A and ring 16 can allow all needles and jacks to fall out of their grooves.

In this application I do not claim the needle-cylinder having needles upon the outside and a cam for operating upon the needles located within the needle-cylinder, as such is claimed in an application filed by me September 15, 1890, Serial No. 365,098.

I claim as my invention—

1. In a circular-knitting machine, the combination of a needle-cylinder and a cylinder held in connection therewith, the last-named cylinder having provisions for holding the needles in their grooves when in its normal position and being capable of an oscillatory or rotary movement which will release the needles and permit their removal, substantially as set forth.

2. In a circular-knitting machine, the combination of a needle-cylinder, a cylinder surrounding the needle-cylinder and provided with a slot, said cylinder holding the needles in their grooves when in its normal position and being capable of an oscillatory or rotary movement to bring the slot in line with any needle-groove, thereby permitting the removal of the needles, substantially as set forth.

3. In a circular-knitting machine, the combination of a cylinder provided with grooves, needles and jacks located in the grooves, a collar surrounding the cylinder, holding the jacks in working position, a slotted cylinder held in connection with the needle-cylinder, which holds the needles in their working position, and a cam for raising and lowering the needles in the process of knitting, substantially as set forth.

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Witnesses:
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