A. E. CHERNACK.

BRAIDING MACHINE.

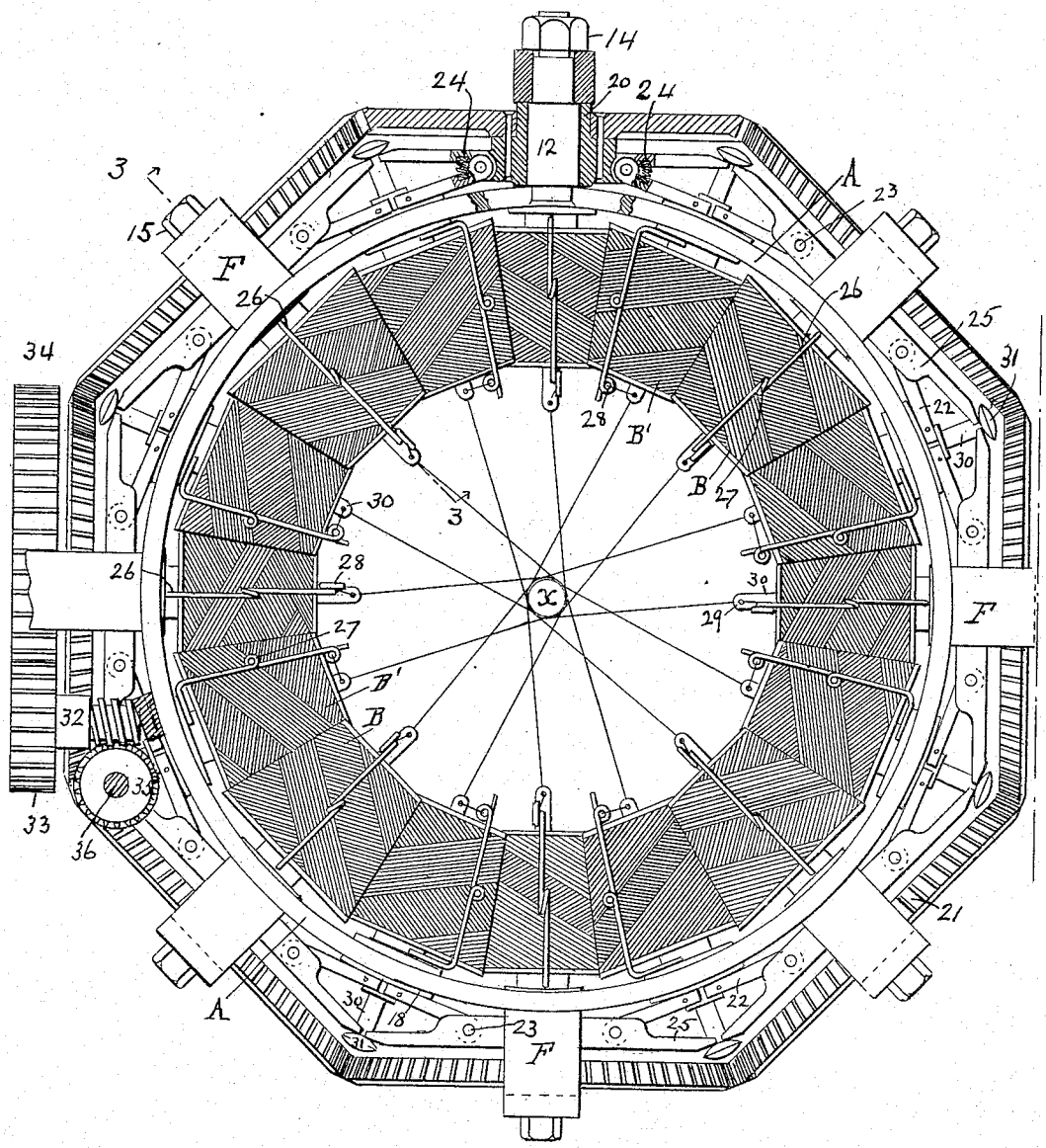
APPLICATION FILED OCT. 23, 1908.

939,216.

Patented Nov. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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4 SHEETS—SHEET 2.

Fig. 2.

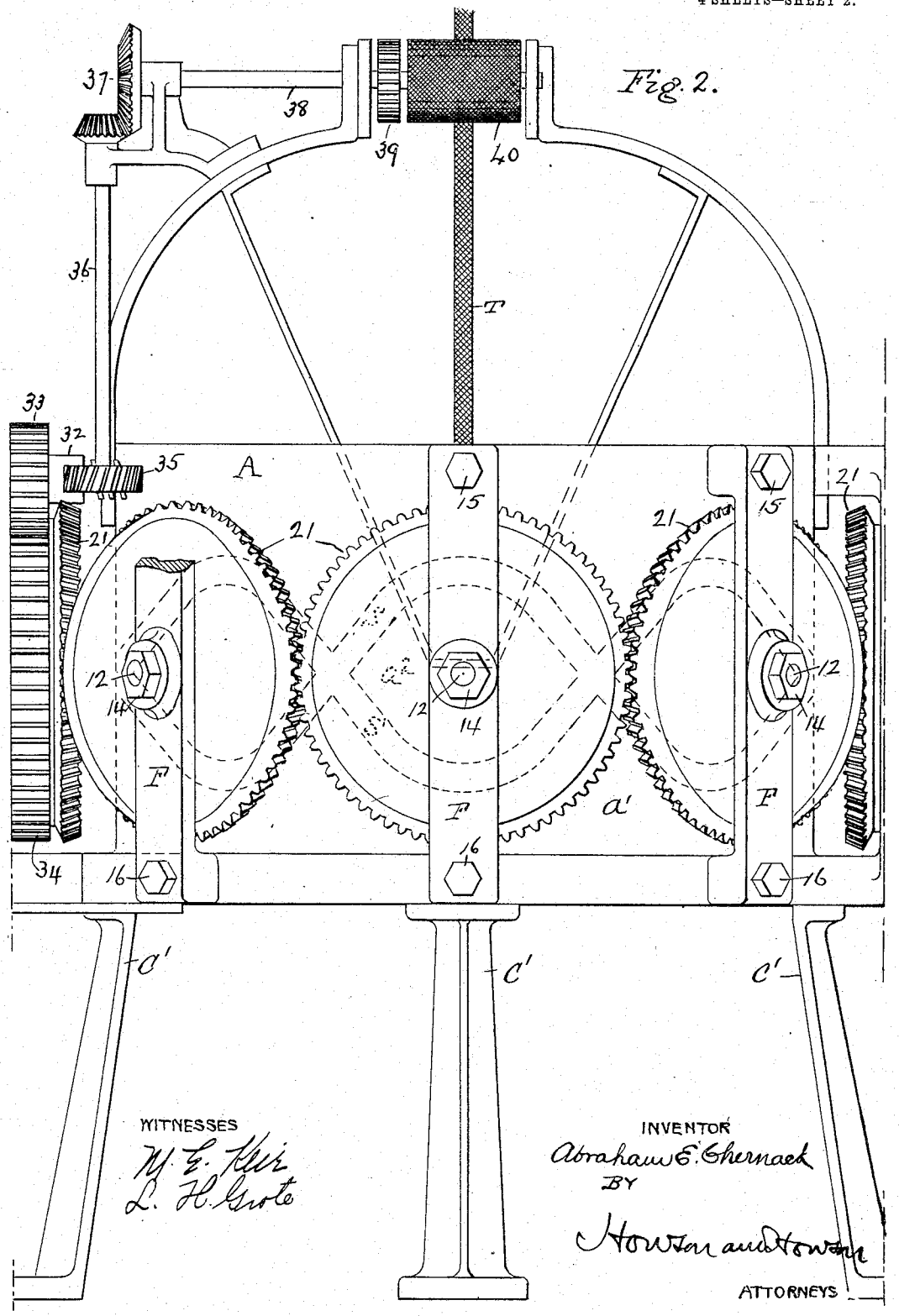

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Fig. 3.

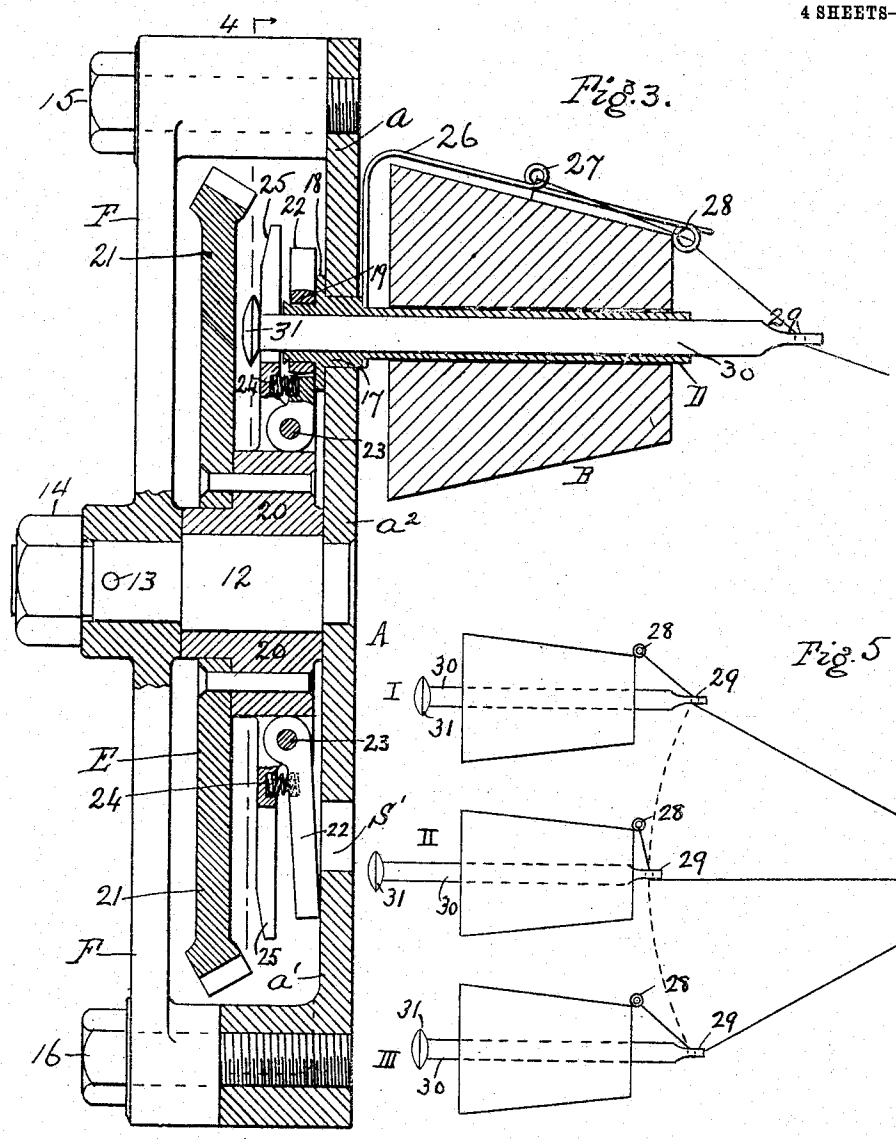
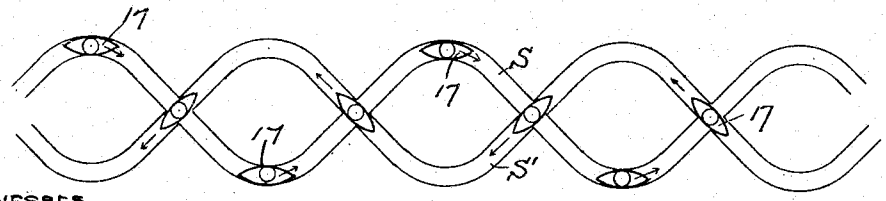


Fig. 5

Fig. 6.



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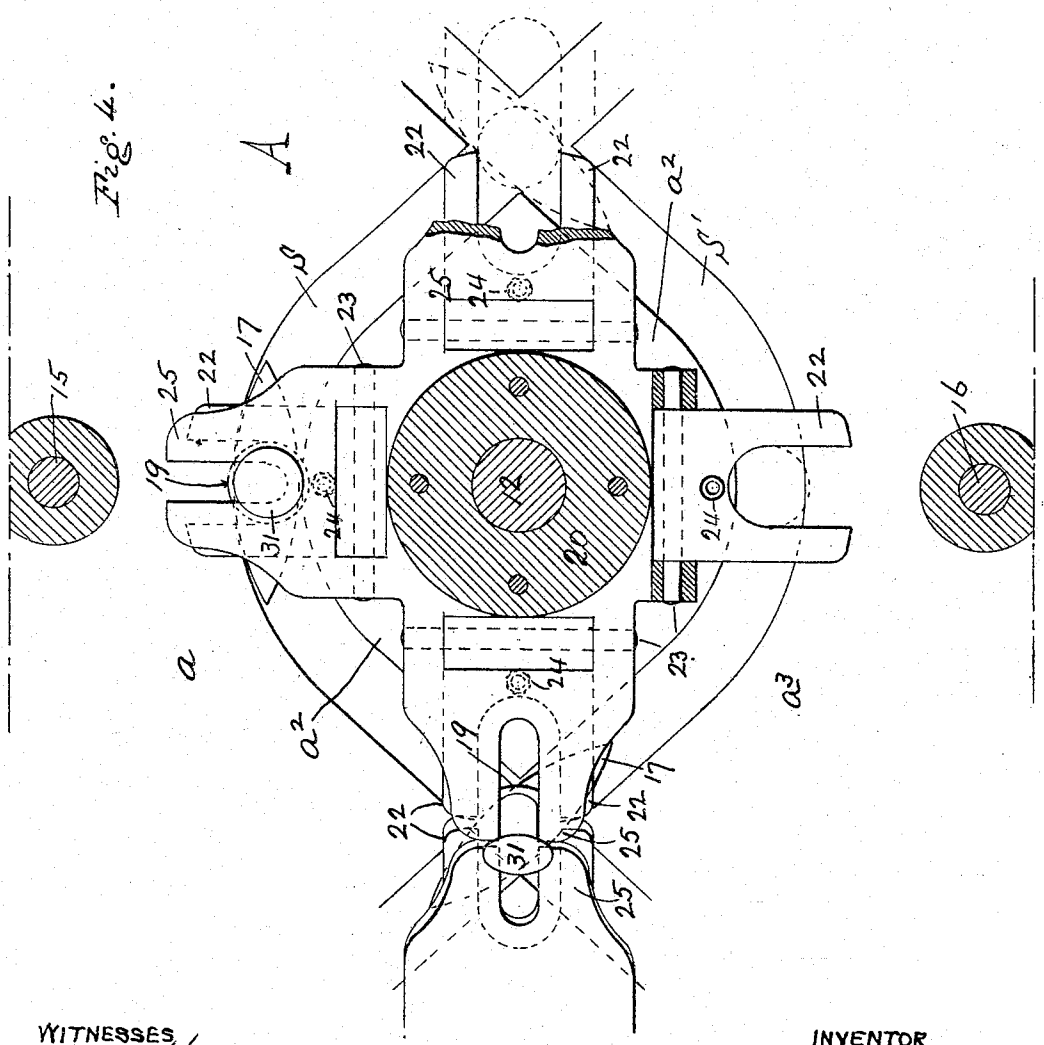
4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ABRAHAM E. CHERNACK, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CHERNACK BRAIDER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

BRAIDING-MACHINE.

939,216. Specification of Letters Patent. Patented Nov. 9, 1909.

Application filed October 23, 1908. Serial No. 459,129.

To all whom it may concern:

Be it known that I, ABRAHAM E. CHERNACK, a subject of the Emperor of Russia, and residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Braiding-Machines, of which the following is a specification.

My invention relates to braiding machines of that class in which two sets of bobbins traveling in opposite directions in serpentine raceways cross each other and thereby cause their yarns or threads to be braided together at a common center.

The main object of my invention is to so construct such a machine as to increase its speed and productive capacity without increasing liability to break the threads and without rendering the product defective in any particular.

Although my improvements hereinafter described and claimed are applicable to machines for braiding either flat or tubular braids, I have shown my invention in the accompanying drawings as embodied in a machine for braiding the yarns or threads together in the form of a tube, over a core or not, as desired.

In the accompanying drawings Figure 1 is a plan view, partly in section, of a braiding machine constructed in accordance with my invention; Fig. 2 is a front elevation with part broken away; Fig. 3 is a sectional view on the line 3—3, Fig. 1 drawn to a larger scale; Fig. 4 is a sectional view on the line 4—4, Fig. 3; Figs. 5 and 6 are diagrams.

In the braiding machine shown in these drawings, the two sets of bobbins B, B^1 are arranged to travel in horizontal positions in sinuous race-ways S, S^1, crossing each other, on the inner face of a cylinder A, which is preferably arranged with its axis upright and supported upon suitable legs C^1, C^1, but it will be understood that my improvements, or some of them, are applicable to other constructions and other types of braiding machines. In the construction illustrated, the raceway cylinder is built up of an upper ring *a*, a lower ring a^1 and the intermediate plates a^2, severally held in proper relation to each by upright brackets F (eight in the case shown) so as to form between the rings and plates the endless sinuous raceways S and S^1, crossing each other (Figs. 4 and 6), throughout the circumference of the cylinder thus formed. The plates a^2 may each be secured by being riveted to a central bolt 12, secured by any suitable means, such as a pin 13 and nut 14 in a boss in the center of the bracket F, Fig. 3. The rings *a* and a^1 may be secured by bolts 15, 16 passing through bosses in the ends of the upright brackets F into the respective rings.

The horizontal spindle D to receive each bobbin is arranged to stand radially in the cylinder and is made hollow and has an elongated shoe 17 to travel in its raceways S, S^1, with flange 18 adapted to bear against the outer face of the cylinder A. Considerable space is left between the outside of the clyinder A and each bracket F to receive the mechanism for traversing the sets of bobbins along their sinuous raceways. This mechanism consists principally of revolving conveyer wheels with slotted arms to engage the outer extensions of the spindles D. In the embodiment of this part of the invention here shown, there is mounted to turn on each bolt 12, Fig. 3, a compound wheel E, comprising a hub 20 with beveled gear wheel 21 and radially slotted conveyer arms 22, and in addition I provide a second set of radially slotted arms 25 for a purpose hereinafter described. There are as many of these conveyer wheels as there are bends in each raceway above and below the center line where the raceways cross each other. In the machine shown, there are eight of these wheels around the outside of the raceway cylinder, Fig. 1, and the bevel wheels 21 are made of such a diameter as to gear directly into each other, and consequently the successive wheels are caused to revolve in opposite directions. The number of conveyer arms 22 on each wheel will depend upon the number of bobbins to be traversed. In the case illustrated I have provided on each wheel four conveyer arms 22, the radial slots in the arms being open at their outer ends as shown in Fig. 4. Outward extensions of the bobbin spindles carrying antifriction rollers 19 and adapted to engage, and to be disengaged from, the slots of these conveyer arms and the spindles and their bobbins are thus each traversed by each wheel from one crossing point in the race-ways to the next, and there delivered to an arm of the next wheel ready to receive it and carry it forward in its sinuous path. As will be understood by reference to Fig. 4, the

form of the traveling shoe 17 is such as to keep each spindle from escaping from its proper raceway at the crossings.

The conveyer arms 22 are hinged to the hubs of their respective wheels E at 23, so that the outer ends of these arms may swing toward the outer face of the cylinder A, and spiral springs 24 are provided to press them toward the cylinder. Thus as each wheel revolves and the arms 22 pass from the vertical position shown in Fig. 3 to the horizontal position shown in Fig. 1, these arms swing on their hinges from a position in a plane parallel with the plane of revolution of the wheel E as a whole, or its gear wheel 21 (Fig. 3) to positions at angles thereto as shown in Fig. 1. The advantage of this construction is that it avoids a tendency of the slotted arms 22 to bind on the spindles D, such a tendency as would occur with the use of unhinged arms acting on elongated extensions of the spindle.

By arranging the braiding point X, Fig. 5, in the same horizontal plane with the crossing of the raceways S and S^1, the slack in the threads between the bobbins and the braiding point due to the rising and falling movements of the bobbins in following their serpentine paths is small compared with that in ordinary braiding machines, and this slack can be compensated for by a simple take-up device, which I will now describe.

Each bobbin spindle carries an arm or wire 26 with guide eyes 27, 28, for the thread. From the guide eye 28 the thread is passed through an eye 29 in the end of a rod 30 which passes through the hollow spindle D. The thread passes from the eye 29 to the braiding point X, Fig. 5. The end of the rod 30 opposite that with the thread guide has a collar 31, Fig. 3, and is adapted to enter the open-ended slot in the radial arm 25, which as before mentioned, is arranged adjacent to each conveyer arm 22 on each wheel E, so that as the outward extension of each bobbin spindle D engages a conveyer arm 22, the outer end of the rod 30 in that spindle will at the same time engage the corresponding arm 25. As these arms 25 of each wheel revolve in a plane perpendicular to the axis of the wheel, the rods 30, at the top or bottom positions of the bobbins in the curved raceways S, S^1, will, as indicated at I and at III in the diagram Fig. 5, be drawn by the tension of the threads inwardly toward the axis of the machine, but as those bobbins move toward the crossings of the raceways, where the bobbins come into the horizontal plane which passes through the braiding point and therefore nearer to the latter, the arms 25, acting on the heads 31 of the rods 30, will draw the rods outwardly to a proportionate extent and so keep the threads taut as indicated at II in the diagram, Fig. 5.

In the drawings I have shown a machine adapted to operate 16 bobbins. In the diagram Fig. 6, I have indicated eight of them in their relative positions and directions of movement at a given time in the operation of the machine.

Motion may be imparted to the moving parts of the machine in any suitable way. For example, one of the bevel gear wheels 21 may have secured to it a gear wheel 34 driven by a pinion 33 on a driving shaft 32, Figs. 1 and 2. The braided tube T may be fed upwardly from the braiding point by a pair of feed rollers 40, Fig. 2, driven from the shaft 32 through a worm and worm wheel 35, shaft 36, bevel gears 37, shaft 38 and gears 39.

I claim as my invention:

1. A braiding machine, having a cylinder, with serpentine raceways crossing each other, in combination with two sets of bobbins and means for traversing the bobbins in opposite directions in the raceways, said traversing means including rotary wheels and slotted hinged conveyer arms and means to keep the hinged arms toward the cylinder.

2. A braiding machine, having a cylinder with serpentine raceways, crossing each other, in combination with two sets of bobbins and means for traversing the bobbins in opposite directions in the raceways, said traversing means including rotary wheels, outside the cylinder, slotted conveyer arms hinged to the wheels, springs to press the arms toward the cylinder, said arms being adapted to engage, and be disengaged from, the bobbin spindles as the wheels rotate and to transfer the spindle from one wheel to the next.

3. A braiding machine, having a cylinder with serpentine raceways crossing each other in the plane of the braiding point, in combination with two sets of bobbins, means for traversing said bobbins in opposite directions in the raceways, thread guides for each bobbin and means for moving one of said thread guides to take up the slack of the thread as the bobbin passes from one position to another.

4. A braiding machine, having a cylinder with serpentine raceways, crossing each other in the plane of the braiding point in combination with two sets of bobbins, means for traversing said bobbins in opposite directions in the raceways and means for taking up the slack of the threads of the bobbins as they pass from one position to another across said braiding plane.

5. A braiding machine, having a cylinder with serpentine raceways crossing each other, in combination with two sets of bobbins, hollow spindles therefor, thread-guide rods in the hollow spindles, means for traversing the spindles in the raceways and means for moving the said rods in the spindles to take

up the slack of the threads as the bobbins pass from one position to another.

6. A braiding machine, having a cylinder with serpentine raceways crossing each other, in combination with two sets of bobbins, spindles and thread-guide rods, and means for traversing the bobbin spindles in the raceways, said means including rotary wheels with conveyer arms to engage, and be disengaged from, the bobbin spindles and slotted arms also on the wheels to engage the thread-guide rods to move them to take up the slack of the threads, as the bobbins pass from one position to another.

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

ABRAHAM E. CHERNACK.

Witnesses:
R. B. ELLMO,
K. E. SMITH.