A. PETERSEN.

ROTARY BRAIDING MACHINE.

APPLICATION FILED SEPT. 3, 1909. RENEWED MAR. 28, 1912.

1,046,107.

Patented Dec. 3, 1912.

5 SHEETS—SHEET 1.

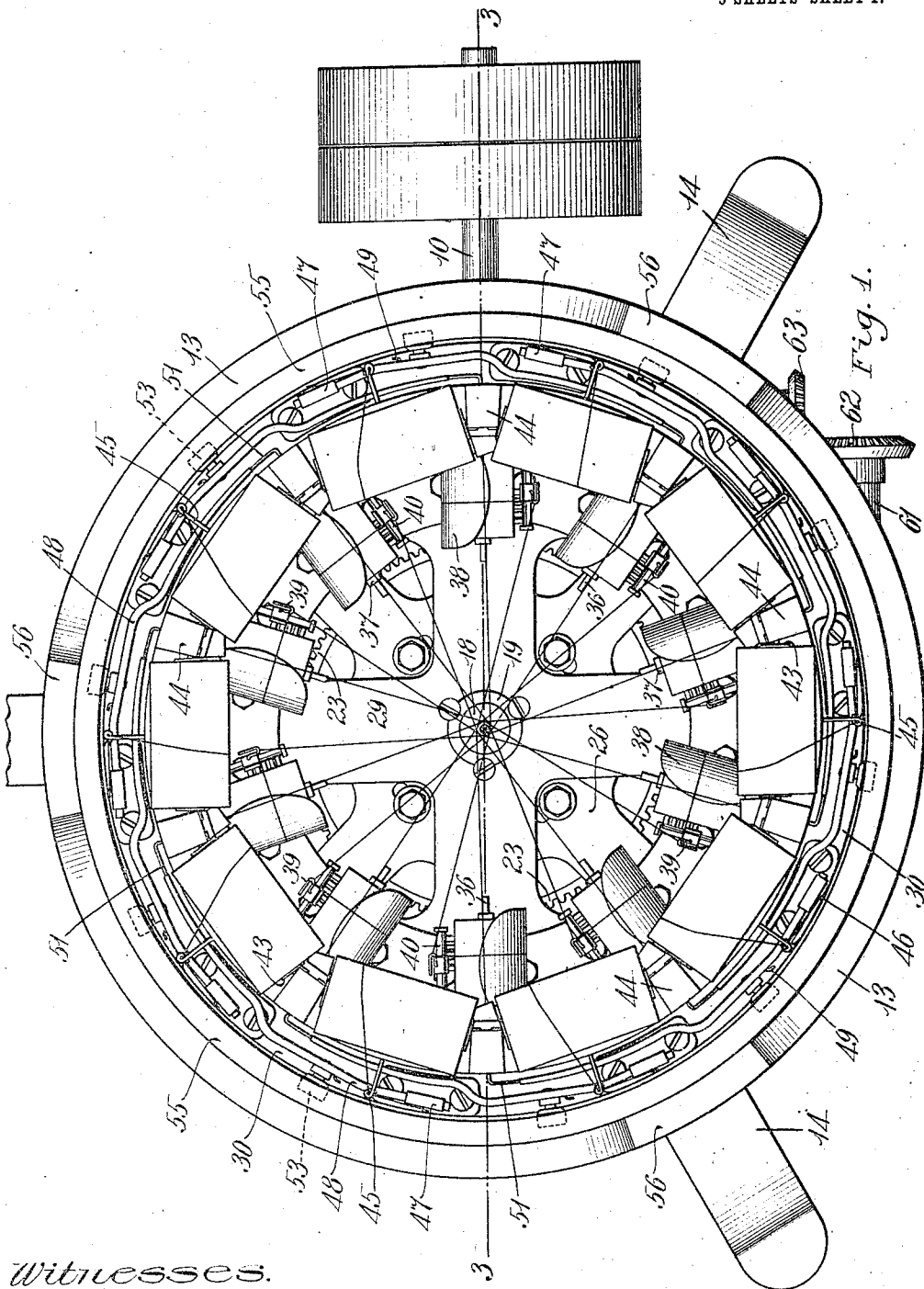

Fig. 1.

Witnesses.

Franklin E. Low

Sydney E. Taft.

Inventor:

Anker Petersen

by his attorney Charles S. Gooding.

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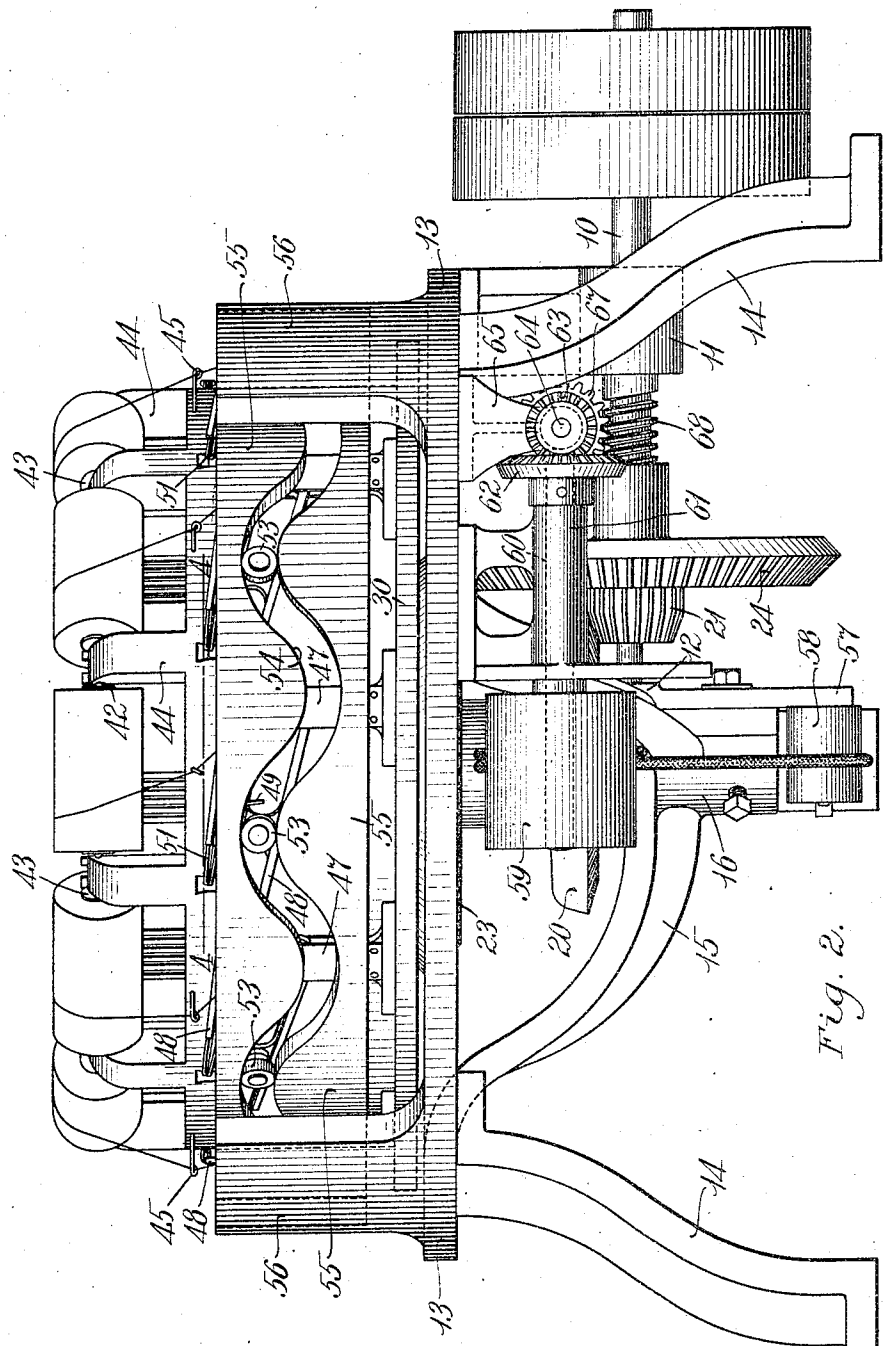

Fig. 2.

Witnesses.
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Sydney C. Taft.

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5 SHEETS—SHEET 3.

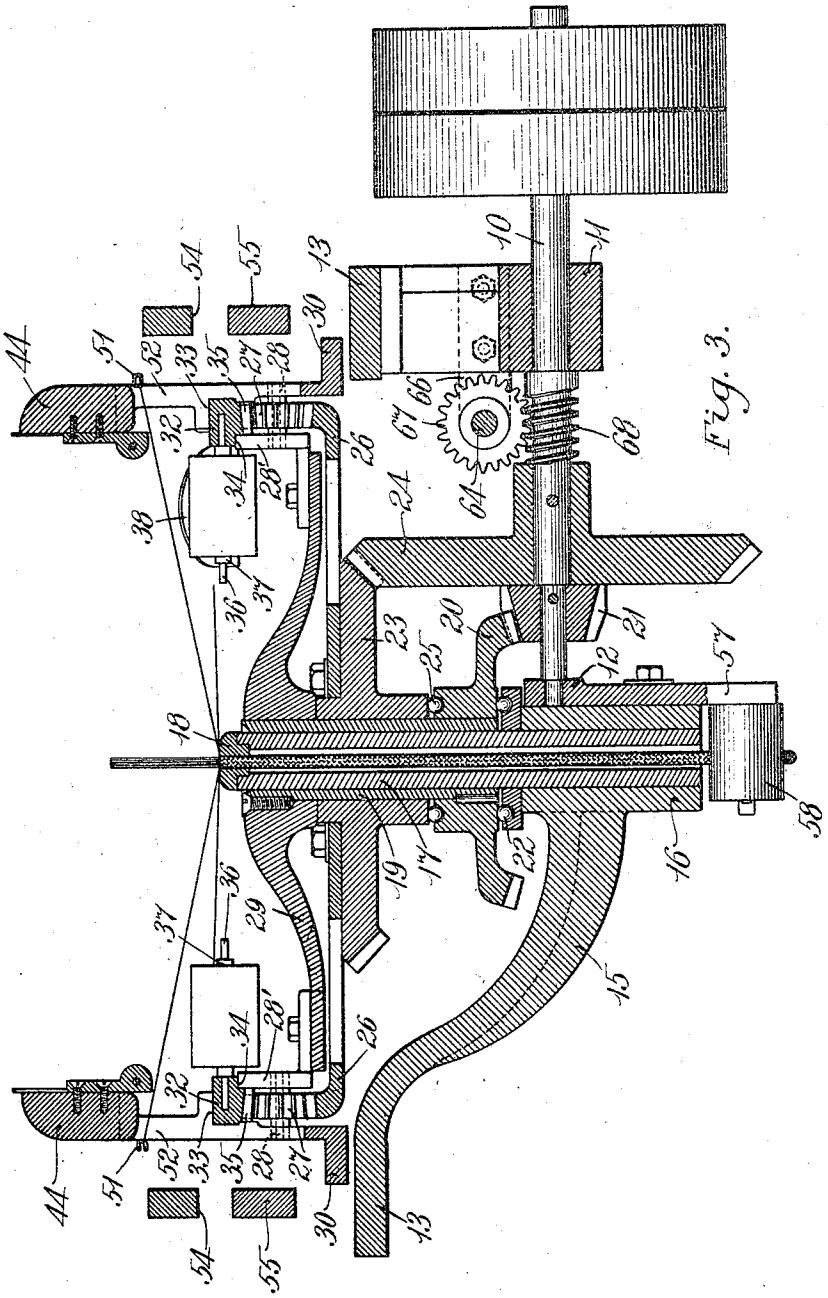

Fig. 3.

Witnesses.

Franklin E. Low

Sydney E. Toft.

Inventor:

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APPLICATION FILED SEPT. 3, 1909. RENEWED MAR. 28, 1912.

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5 SHEETS—SHEET 4.

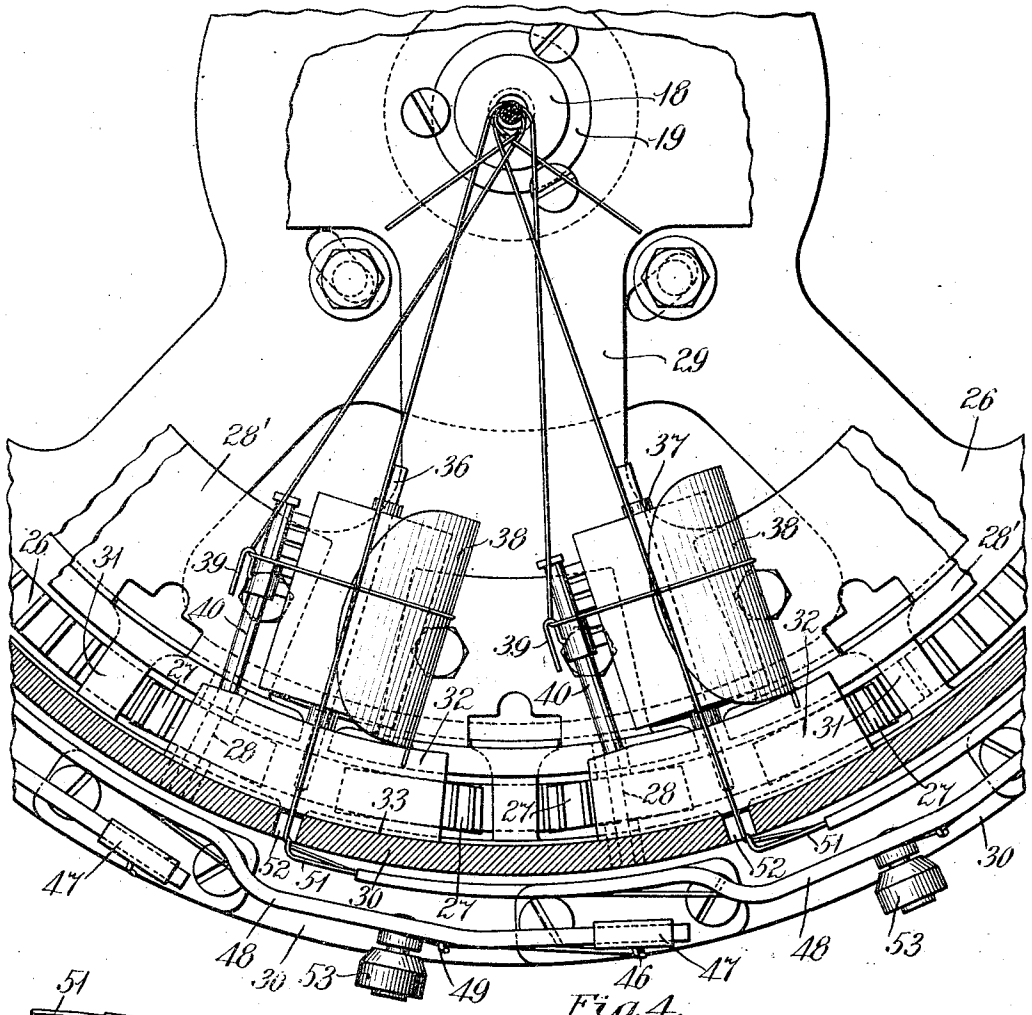

Fig. 4.

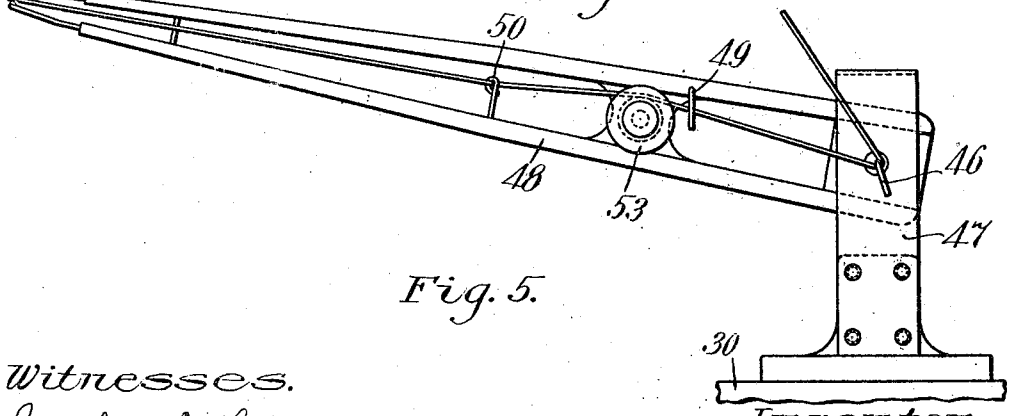

Fig. 5.

Witnesses.

Franklin E. Low

Sydney E. Taft.

Inventor:

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by his attorney, Charles J. Goding.

A. PETERSEN.

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APPLICATION FILED SEPT. 3, 1909. RENEWED MAR. 28, 1912.

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5 SHEETS—SHEET 5.

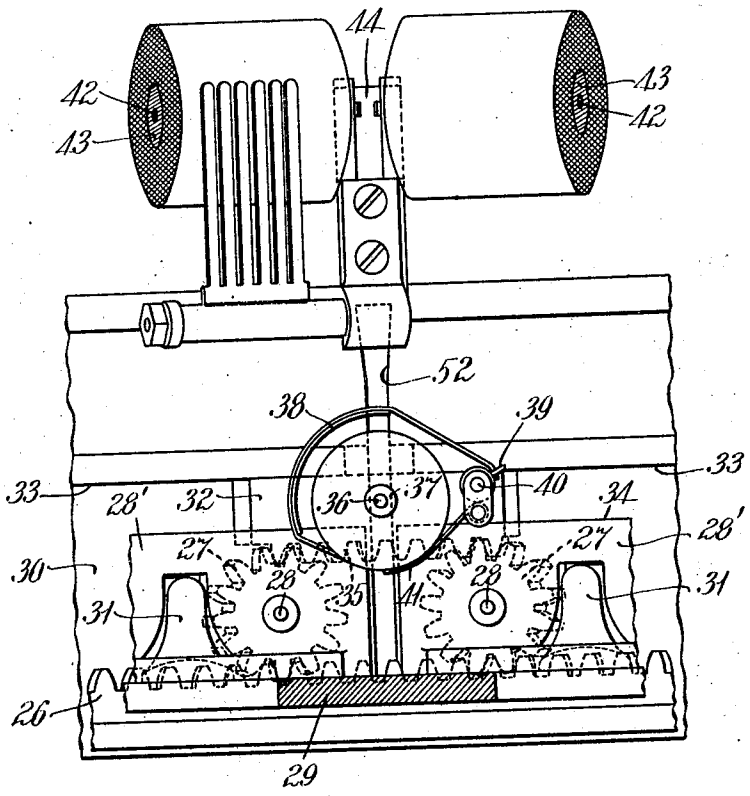

Fig. 6.

Witnesses.
Franklin E. Low
Sydney E. Taft.

Inventor:
Anker Petersen
by his attorney Charles N. Goodwin.

UNITED STATES PATENT OFFICE.

ANKER PETERSEN, OF WINTHROP, MASSACHUSETTS, ASSIGNOR TO BOSTON MACHINERY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

ROTARY BRAIDING-MACHINE.

1,046,107. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed September 3, 1909, Serial No. 516,039. Renewed March 28, 1912. Serial No. 686,973.

To all whom it may concern:

Be it known that I, ANKER PETERSEN, a subject of the King of Denmark, residing at Winthrop, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Rotary Braiding-Machines, of which the following is a specification.

This invention relates to an improved rotary braiding machine, and the object is to provide a braiding machine which shall be capable of operating at a high rate of speed and increasing the output over machines heretofore used. This result is attained by providing a set of spool carriers traveling in a regular path of movement in one direction, by providing a body rotating in the opposite direction and carrying another set of spools and by providing strand carrying levers which throw the strands alternately over and under the spool carriers.

Another important result obtained is that no slack forms in the strands and, therefore, no take-up devices are required.

The invention consists in the novel feautres of construction and in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the appended claims.

Referring to the drawings: Figure 1 is a plan of a braiding machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a detail sectional view taken on line 3—3 of Fig. 1. Fig. 4 is an enlarged detail plan section taken on line 4—4 of Fig. 2 and partly broken away to save space in the drawings. Fig. 5 is a side elevation of one of the strand carrying levers and the bracket on which it is pivotally supported. Fig. 6 is a detail elevation viewed from the center of the machine showing two spools of the upper series and one spool of the lower series, the lower spool being shown on its spool carrier and driving gears being also shown.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is a main driving shaft journaled in bearings 11 and 12 on a frame 13 having legs 14 to support the same on the floor. A spider 15 constituting a part of the frame of the machine is provided with a hub 16 in which is secured a hollow stationary spindle 17 surmounted by a bushing 18. A sleeve 19 journaled on the spindle 17 has secured thereto a bevel gear 20 meshing into a bevel pinion 21 fast to the shaft 10, said gear and sleeve being preferably supported upon a radial ball bearing 22. Journaled on the sleeve 19 is a miter gear 23 meshing into a miter gear 24 fast to the shaft 10, the former gear being preferably supported upon a radial ball bearing 25. Fast to the miter gear 23 is a large bevel gear 26 into which a series of bevel pinions 27 mesh, said bevel pinions being mounted on shafts 28. The pinions 27 are arranged in pairs and the shafts of each pair terminate in a bracket 28′ fast to a rotary member 29, while the outer ends of said shafts terminate in a ring 30 which is secured to the member 29 by a series of webs or spokes 31 thus constituting the member 29 and the ring 30 a single rotating body, the member 29 being fast to and driven by the sleeve 19.

It will be understood by observing the ratio of the gears 20 and 21 and gears 23 and 24, that the member 29 and ring 30 are rotated in the same direction as the gear 26, but at a less speed, the consequence being that the bevel pinions 27 are rotated on their own axes and revolved about the gear 26.

A series of thread-mass carriers 32 all separate and distinct from each other are mounted to slide in ways 33 formed in the ring 30 and upon ways 34 formed on the brackets 28′, said thread-mass carriers having formed thereon or fast thereto segmental gears 35 which are adapted to mesh into the pinions 27 in succession each segmental gear being arranged to mesh with each succeeding pinion before passing out of mesh with the preceding pinion. In this way it will be seen that the thread-mass carriers 32 are revolved about the center of the machine in a direction opposite to the direction of rotation of the ring 30 and member 29 and are maintained in their proper spacing with relation to each other.

Each of the thread-mass carriers 32 supports a spindle 36 upon which the spool 37 is mounted to rotate. The thread wound on the spool 37 leads therefrom around a guard 38 fast to the thread-mass carrier 32 and thence through a thread guide 39 mounted upon a rod 40 fast to said spool carrier the several strands leading from the several thread carriers 39 to the braiding point at

the bushing 18. The proper tension is maintained upon the thread by spring tension devices 41 mounted upon the thread-mass carriers 32 and bearing against the spools of thread, respectively.

A series of spindles 42 constituting thread-mass supports having thereon spools 43 are mounted in suitable supports 44 upon the ring 30, the threads leading from their respective spools to thread guides 45, respectively, and thence through thread guides 46, respectively, secured to brackets 47 mounted upon the ring 30, the last mentioned thread guides being located at the axes of strand carrying levers 48 pivotally supported upon said brackets. The threads pass from the thread guides 46 through thread guides 49, 50 and 51 mounted upon the levers 48 and the strands extend from the last-mentioned thread guides through vertical slots 52 in the ring 30 and through the spaces which separate the brackets 28′ from each other, to the braiding point at the bushing 18. The function of the strand carrying levers 48 is to throw their strands alternately over and under the thread-mass carriers 32 to cause two series of strands to interlace with each other at the braiding point and for this purpose said levers have journaled thereon cam rolls 53 located in a serpentine slot 54 in a stationary cam 55 mounted on uprights 56 forming a part of the frame 13.

It will be observed that the two series of spools move in regular circular paths concentric with the center of the machine and the only reciprocating parts of the machine are the strand carrying levers 48, and it is possible to make these levers so light that the machine is capable of operating at a much higher speed than has heretofore been possible. Furthermore, it is possible by increasing the number of the strand carriers as by having two strand carriers to each spool carrier to interlace the strands to introduce a greater number of strands than there are spool carriers, if desired, thus causing the fabric to be built up with greater rapidity than has heretofore been possible.

I will now proceed to describe the feeding mechanism.

The hub 16 of the spider 15 supports a bracket 57 on which is rotatably supported an idler drum 58 which guides the braided fabric as it passes downwardly inside of the hollow spindle 17. The fabric passes from the idler 58 several times around a feed drum 59 fast to a shaft 60 journaled in a bearing 61 fast to the frame 13, said shaft having fast thereto a bevel gear 62 meshing into a bevel pinion 63. The bevel pinion 63 is fast to a shaft 64 journaled in bearings 65 and 66, said shaft having also fast thereto a worm gear 67 which meshes with a worm 68 fast to the main driving shaft 10. As the main driving shaft is rotated, the gearing just described imparts the proper rotation to the feed drum 59, thereby feeding the fabric from the machine at the proper speed.

While I have described the ring 30 carrying one set of spools as rotating in one direction and the spool carriers 32 carrying the other set of spools as revolving in the opposite direction, it will be evident that their motion is necessarily only relative and I have chosen in the present instance to move them in opposite directions for convenience of construction and for attaining a relatively high rate of speed between the two to increase the speed of operation of the machine without increasing the actual speed of rotation of any one of its parts.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A rotary braiding machine having, in combination, a series of thread-mass carriers having segmental gears thereon, a series of pinions adapted to mesh successively with said segmental gears, a gear meshing with said pinions, a body on which said pinions are journaled and upon which said carriers are supported and guided, a series of thread-mass supports mounted on said body, means to impart a rotary motion to said body and said gear in the same direction but at different speeds, a series of strand-carriers carried by said body, and means acting on said strand-carriers to cause the same to carry the strands leading from said thread-mass supports alternately over and under said thread-mass carriers.

2. A rotary braiding machine having, in combination, a series of gear segments constituting thread-mass carriers, a rotatable body on which said gear segments are mounted to revolve about the axis of said body, a series of thread-mass supports mounted on said body, gearing to drive said segments and said body in opposite directions including pinions journaled on said body and adapted to mesh with said gear segments successively, a series of strand-carriers carried by said body, and means acting on said strand carriers to cause the same to carry the strands leading from said thread-mass supports alternately over and under said thread-mass carriers.

3. A rotary braiding machine having, in combination, a series of gear segments constituting thread-mass carriers, a rotatable body on which said gear segments are mounted to revolve about the axis of said body, a series of thread-mass supports mounted on said body, gearing to drive said segments and said body in opposite directions including pinions journaled on said body and adapted to mesh with said gear segments successively, a series of strand-carrying levers pivotally supported on said body, and means to impart a rocking move-

ment to said levers to cause the same to carry the strands leading from said thread-mass supports alternately over and under said thread-mass carriers.

4. A rotary braiding machine having, in combination, a series of gear segments constituting thread-mass carriers, a rotatable body on which said gear segments are mounted to revolve about the axis of said body, a series of thread-mass supports mounted on said body, gearing to drive said segments and said body in opposite directions including pinions journaled on said body and adapted to mesh with said gear segments successively, a series of strand-carriers carried by said body, and a sinuous cam to impart a to and fro motion to said strand-carriers to carry the strands leading from said thread-mass supports alternately over and under said thread-mass carriers.

5. A rotary braiding machine having, in combination, a series of gear segments constituting thread-mass carriers, a rotatable body on which said gear segments are mounted to revolve about the axis of said body, a series of thread-mass supports mounted on said body, said body being provided with a series of slots for the strands leading from said thread-mass supports, gearing to drive said segments and said body in opposite directions including pinions journaled on said body and adapted to mesh with said gear segments successively, a series of strand carriers carried by said body, and means acting on said strand-carriers to cause the same to carry the strands leading from said thread-mass supports through said slots alternately over and under said thread-mass carriers.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ANKER PETERSEN.

Witnesses:

LOUIS A. JONES,

CHARLES S. GOODING.