Sept. 29, 1953

R. M. FRASER

BRAIDING MACHINE

2,653,506

Filed Oct. 3, 1950

2 Sheets-Sheet 1

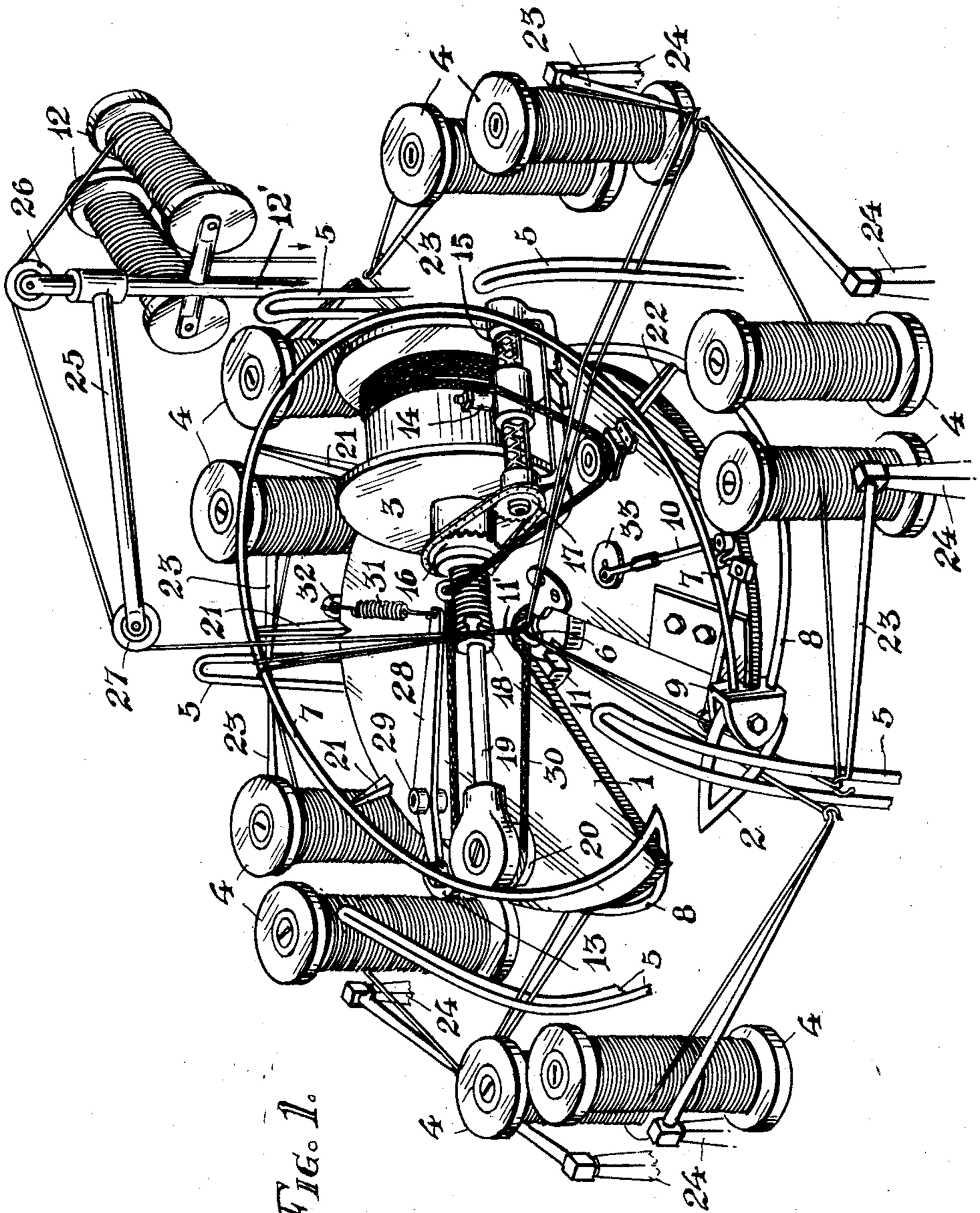

FIG. 1.

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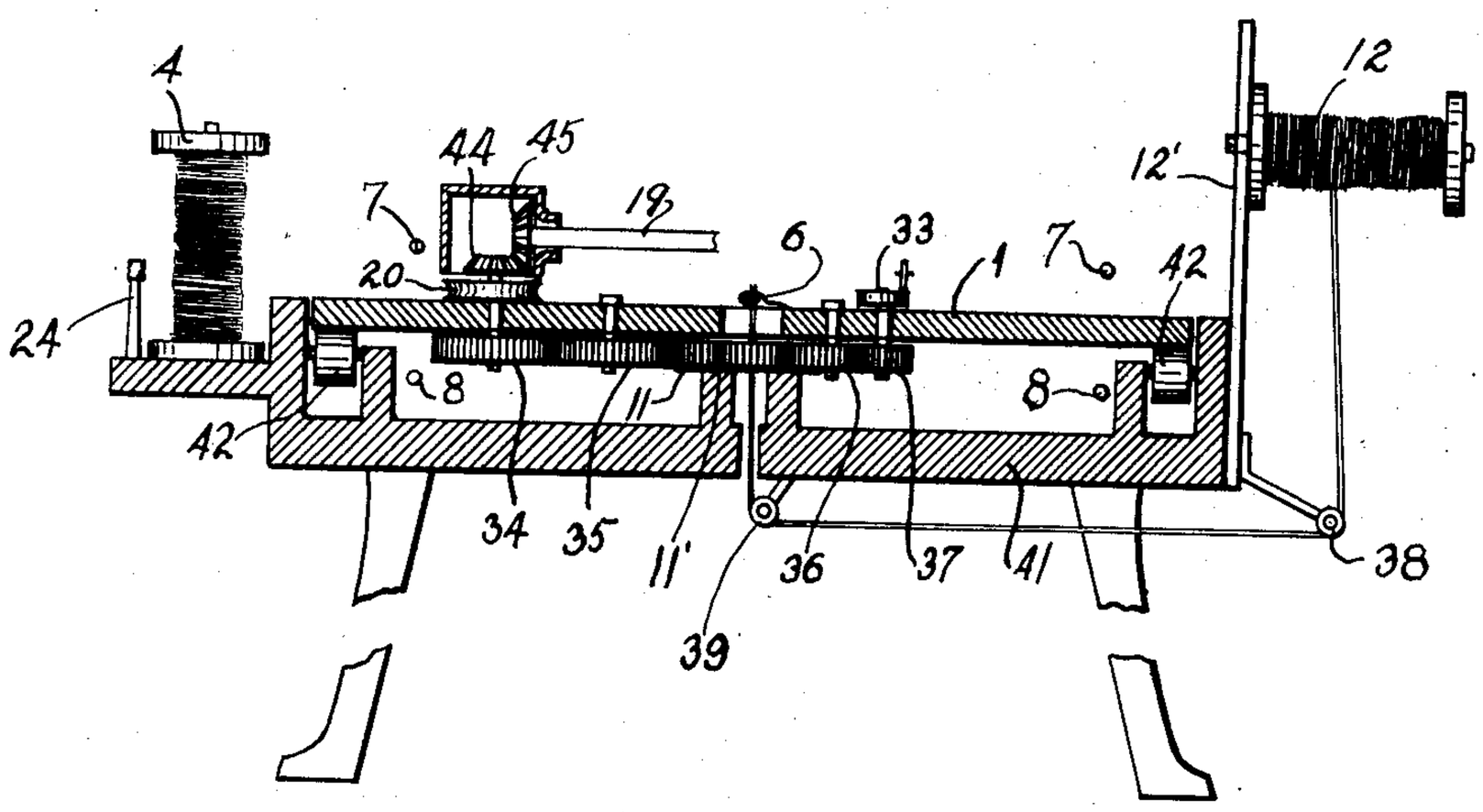

FIG. 2.

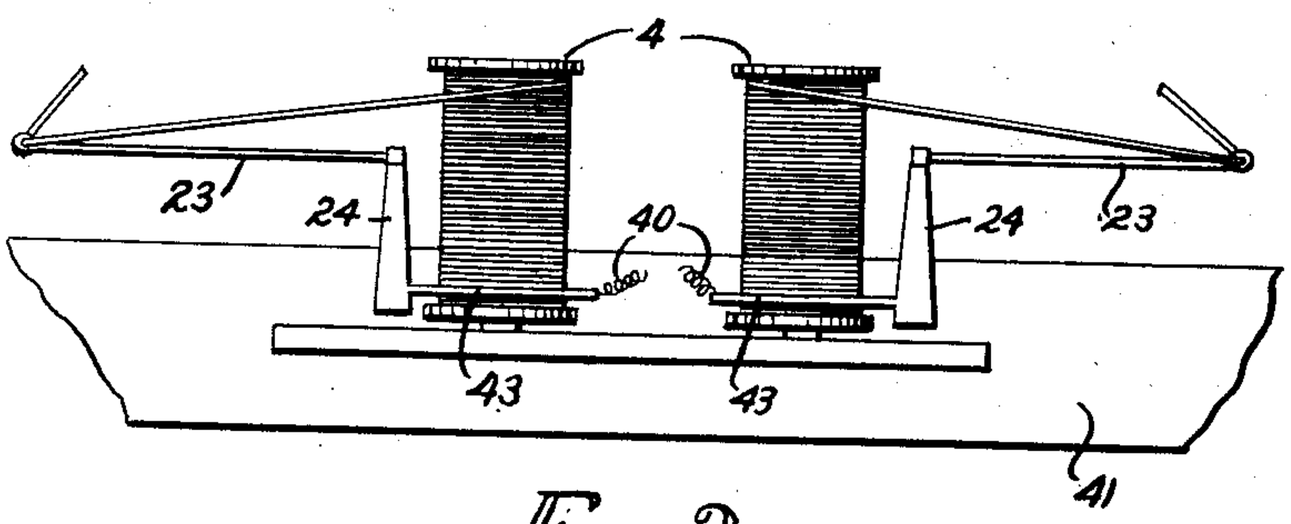

FIG. 3.

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BRAIDING MACHINE

Robert Martin Fraser, Buenos Aires, Argentina

Application October 3, 1950, Serial No. 188,245

10 Claims. (Cl. 87—33)

1

This invention refers to a braiding machine of a new design.

In existing designs of braiding machines, the yarns from the supply bobbins are deflected by swinging arms or bows, or by reciprocating bows pivoted at one end and operated by a mechanism synchronized with the travel of the bobbin which winds up the braid as it is formed. All this involves a large number of parts moving at high speed resulting in rapid wear and a consequent reduction in the working speed of the machine.

One of the purposes of this invention is to produce a braiding machine having no reciprocating bows and in which the yarns converge from supply spools to the centre of a rotating disk, or turntable, which carries the yarn deflectors and acts as a shuttle, guiding the yarns in a predetermined order.

This machine is, therefore, free from the undesirable features of existing braiders in that the elimination of the deflector arms has done away with the stresses inherent to high speed reciprocating machinery and with the resulting limitation in speed. The circular motion of the shuttle makes possible a very much higher operating speed with an increased hourly production. It is evident that with a reduction of moving parts, less overall wear takes place and with it, less maintenance is incurred.

The braiding machine to which this application refers consists mainly of the following parts: a rotating plate or turntable, from which a sector has been cut away, mounted on a fixed base; yarn deflectors arranged about this turntable and a yarn selector also within the opening mentioned; means provided on this turntable whereby an oscillating movement is imparted to the yarn selector and a rotating movement is given to the turntable itself; a revolving bobbin for receiving the manufactured braid; means provided for rotating this bobbin and also for guiding and compactly winding the braid on to this bobbin; at least two yarn deflectors placed one above and one below this turntable; a ring in the centre of the turntable to lead in the yarns and form the braid, means provided for guiding the braid from this ring to the winding bobbin; devices for leading and tensioning the yarns from each supply bobbin; also suitable supports all mounted on the fixed base.

Fig. 1 is a perspective view of the upper portion of the present braiding machine.

Fig. 2 is a cross-sectional view of the machine.

Fig. 3 is a perspective view of yarn tensioning means forming part of the machine.

2

As will be seen, the machine consists of a rotating plate or turntable 1, mounted upon a fixed base 41 provided with rollers 42 on which plate 1 rests. Said fixed base also carries the supply bobbins 4. This turntable 1 has a sector removed from it as shown and on one side of the resulting gap and at the periphery of the turntable is supported a triangular part 2, arranged to pivot about one end. Mounted on turntable 1 is a rotating bobbin 3 upon which the braid 30 is wound as it is produced. Equidistant one from the other about the turntable and fixed to the base are the supply bobbin holders which carry the supply bobbins 4. From these bobbins the yarns are led through the guides 5 and advancing in pairs, they all converge at the central ring 6 where the braid is formed. In order to maintain the correct tension on the yarns, arms 23 are fixed to columns 24 pivotally mounted on base 41. Said columns 24 have further arms 43 extending in an opposite direction to arms 23. Arms 43 are connected to base 41 by springs 40 whereby arms 23 maintain the correct tension on the yarns as they are led into the guides 5.

A deflector 7, secured to the top side of turntable 1 by means of legs 21 and another deflector 8 also secured to the underside of the turntable by legs 22, both ensure that the yarns do not foul any of the rotating mechanisms on turntable 1. Reference to the drawing shows that rings 7 and 8 are joined together at one end in the gap in turntable 1 while the other ends are joined by part 9 which carries the oscillating selector 2.

Fitted close to the underside of turntable 1 and secured to the base is a gear wheel 11, which has a number of radial slots 11' which allow of the passage of the yarns as they converge towards ring 6. The oscillating selector 2, pivoted in part 9, receives its motion through a bell crank coupled to rod 10 and crank 33. Crank 33 is fixed at the end of a shaft rotating in turntable 1 and which carries at its lower end a pinion 37 as shown on Fig. 2. This pinion meshes with gear wheel 11. The ratio of these gears depends upon the number of yarns being handled. The shaft which carries bobbin 3 is fastened, by means of a friction coupling 18, to shaft 19 which is driven by miter gears 44 and 45 from another shaft rotating in turntable 1 which also carries pulley 20. On the other end of this shaft is a gear 34 which engages, through another gear 35, with central gear 11 producing a reduction in speed so that drum 3 rotates with a peripheral speed equal to that of the braid 30 as it leaves ring 6. At the same time, a roller 13, carried on bell crank 28,

pivoted on pin 29 which is fixed to turntable 1, and held under tension by spring 31 fastened to ring 32, forces the braid 30 against pulley 20, thereby flattening it.

A guide column 14 slides upon and is driven by a shaft 15 upon which has been cut left and right hand screws. A sprocket 17 is keyed to this shaft 15 and is driven by a chain and sprocket 16 on the shaft of drum 3. In this way column 14 is made to traverse forwards and backwards in front of bobbin 3 as it rotates.

On a stand 12' secured to the base are two spools 12 which carry the core yarns which form the core of the braid 30. One of these core yarns is fed over pulleys 26 and 27 on support 25 so that it is led vertically to ring 6. Another set of pulleys 38 and 39, Figs. 1 and 2, leads the other yarn from the bobbin to ring 6 from the underside of turntable 1.

Power is transmitted to turntable 1 by any convenient means but provision is made for varying this speed as required.

The machine operates in the following manner:

As turntable 1 rotates, bobbin 3 revolves. Gear wheel 11 causes crank 33 to rotate which, by means of rod 10 and the bell crank, impart a reciprocating movement to oscillating selector 2 which raises and lowers its free end alternately above and below the level of turntable 1. In this manner, selector 2 encounters the yarns from the spools on their way through the guides 5 to the central ring 6 and alternately guides them either above deflector 7 or below deflector 8. Rotation of turntable 1 brings about the deflection of the yarns thus forming the braid. The braid in ring 6 is then pressed by roller 13 against haul pulley 20 and led by guide column 14 to drum 3 where it is wound up.

In the example shown in the drawing, 5 groups of 2 yarns each are braided around the vertical core yarns. The correct gear ratios in this case is such that the pinion which drives crank 33 and oscillating deflector 2 must have 40 teeth; and it is driven by a 100 tooth gear wheel. This means that for one complete revolution of turntable 1, the pinion makes 2.5 turns; i. e. $100/40=2.5$. As there are five groups of yarns, two revolutions will be necessary to complete the cycle since $2.5\times2=5$.

This machine may also be modified without departing to any great extent from the main principles as herein laid down. It is obvious that the parts assembled on turntable 1 could be rearranged in a manner quite different from that shown on the drawing. For example, bobbin 3, instead of being mounted on turntable 1 could readily be built into the turntable; the chain drive and sprockets 16 and 17 could be substituted by a gear drive, a worm drive or any other similar device; crank 33 might be of any other shape. In the same way, the reversing worm which drives guide column 14 could be changed for any other mechanism which produces the same effect.

The braiding machine may be made in any convenient size and of any suitable materials.

Having described and specified the nature of my invention and the manner in which it is made I claim this to be entirely of my own invention and property and is:

1. A machine for braiding yarn comprising a base, a turntable having a recess formed therein and being rotatably mounted on said base, a yarn selector pivotally connected to said turntable at the entrance of said turntable recess, means for imparting an oscillating movement to said yarn selector in synchronization with the rotation of said turntable, a ring mounted at the center of said turntable, a bobbin rotatably mounted on said turntable for winding up the braid from said ring, means for rotating said bobbin with the rotation of said turntable, a pair of yarn deflectors mounted upon and extending from said selector and around the edge of said turntable with one deflector above and one deflector below said turntable, and means for leading and tensioning the yarns being fed radially to said ring from around said turntable.

2. A machine for braiding yarn comprising a base, a turntable having a sector shaped recess and being rotatably mounted on said base, a yarn selector pivotally connected to said turntable and positioned at one side of the entrance to said recess substantially perpendicular to said turntable, means for imparting an oscillating movement to said selector in synchronization with the rotation of said turntable, a bobbin rotatably mounted on said turntable, means for rotating said bobbin with the rotation of said turntable, a ring for collecting the yarns and forming the braid mounted on the center of said turntable, a pair of yarn deflectors mounted upon and extending on a slant from said selector and said recess entrance around the edge of said turntable with one deflector above and one deflector below said turntable, means for leading the formed braid from said ring to said bobbin, a plurality of bobbins for supporting the yarn, means supporting said bobbins on said base and spaced around said turntable, and a plurality of members for leading and tensioning the yarns being fed from said plurality of bobbins to said ring.

3. A machine for braiding yarn as claimed in claim 2 wherein said yarn deflectors are joined together at one end in the entrance to said turntable recess and the opposite ends are connected behind said selector forming continuous contact surfaces for the yarns.

4. A machine for braiding yarn as claimed in claim 2 wherein said yarn selector is of substantially a triangular configuration and said deflectors are positioned with each forming a continuation of a side of said selector.

5. A machine for braiding yarn as claimed in claim 2 wherein the means for oscillating said yarn selector comprises a rod pivotally connected to said selector, a crank pivotally connected to said rod, a shaft rotatably extending through said turntable and having said crank mounted on an end thereof, a pinion connected to the opposite end of said shaft, and a gear wheel concentrically fixed to said turntable and having more teeth than said pinion and meshing therewith.

6. A machine for braiding yarn as claimed in claim 2 wherein the means for oscillating said yarn selector comprises a rod pivotally connected to said selector, a crank pivotally connected to said rod, a shaft rotatably extending through said turntable and having said crank mounted on an end thereof, a pinion connected to the opposite end of said shaft, a gear wheel concentrically fixed to said turntable and having more teeth than said pinion and meshing therewith, and said gear wheel having radial slots formed in the periphery thereof in line with said yarns.

7. A machine for braiding yarn as claimed in claim 2 wherein said yarn leading and tensioning means comprises a plurality of arms each adjacent one of said bobbins and having an

eye through which the yarn passes, a supporting column for each arm pivotally connected to said base, and a spring tending to pivot said column for tensioning the yarn.

8. A machine for braiding yarn as claimed in claim 2 wherein at least one of said yarn leading members is positioned for guiding yarn vertically to said ring and said turntable.

9. A machine for braiding yarn as claimed in claim 2 wherein a pair of said yarn leading members are positioned for guiding yarn vertically to said ring with each member being on an opposite side of said turntable.

10. A machine for braiding yarn as claimed in claim 2 wherein said means for leading the braid from said ring comprises a pulley rotatably mounted on said turntable, and means connecting said pulley with said bobbin rotating means for being driven thereby.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
369,514	Fraser	Sept. 6, 1887