No. 642,977. Patented Feb. 6, 1900.

A. V. GROUPE.

BRAIDING MACHINE.

(Application filed Apr. 24, 1899.)

(No Model.) 3 Sheets—Sheet 1.

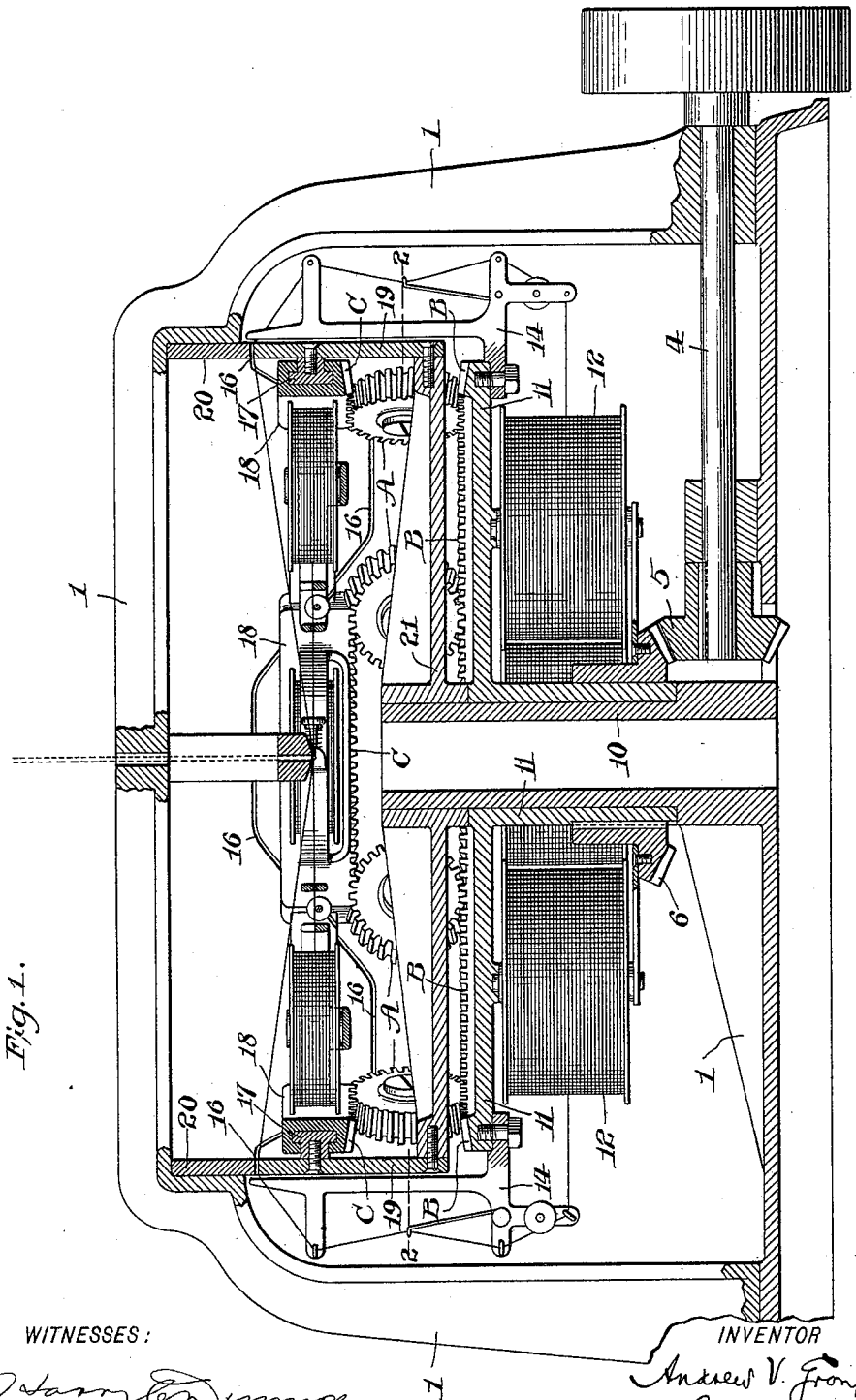


Fig. 1.

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Fig. 2.

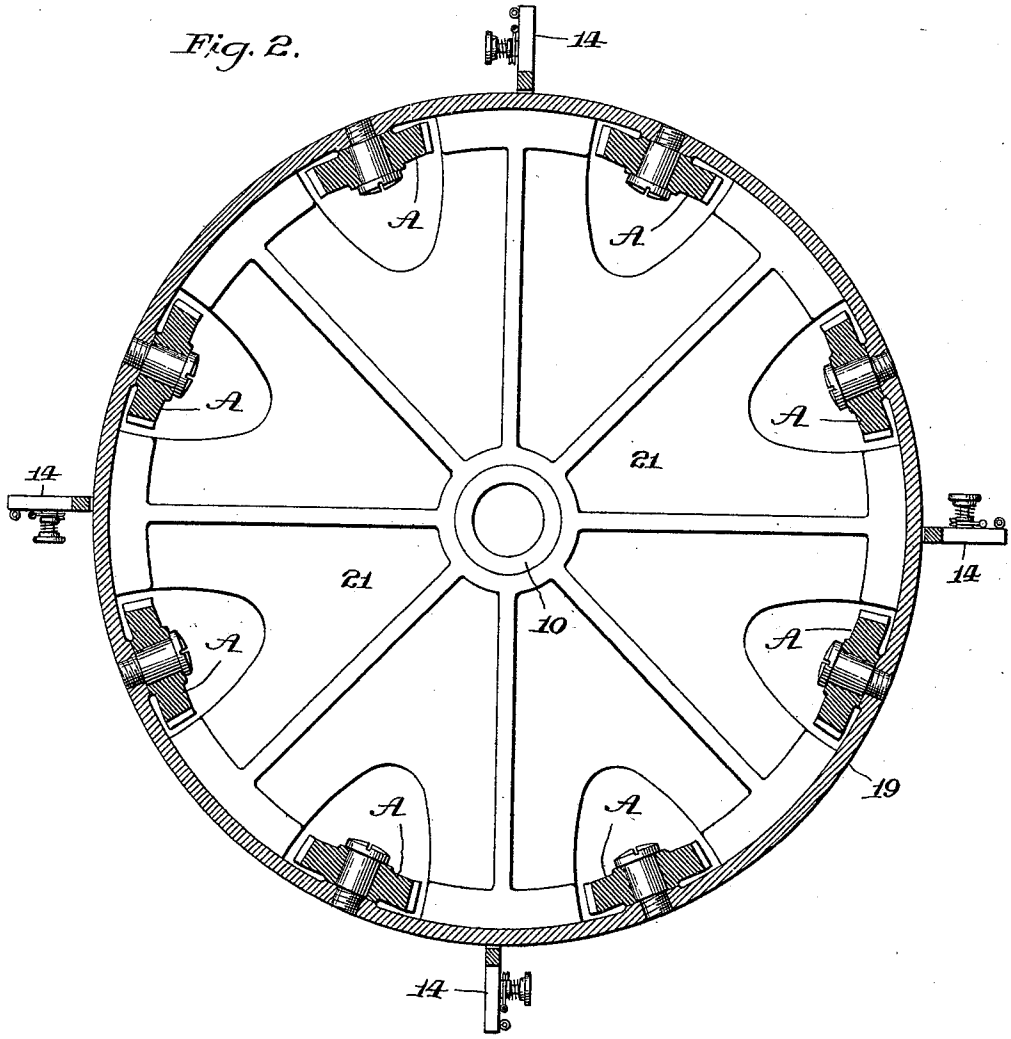
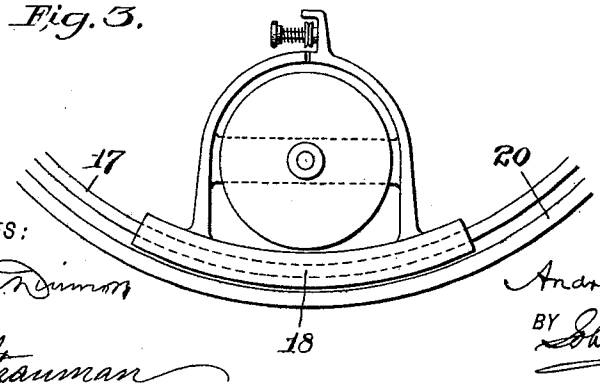


Fig. 3.



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Fig. 4.

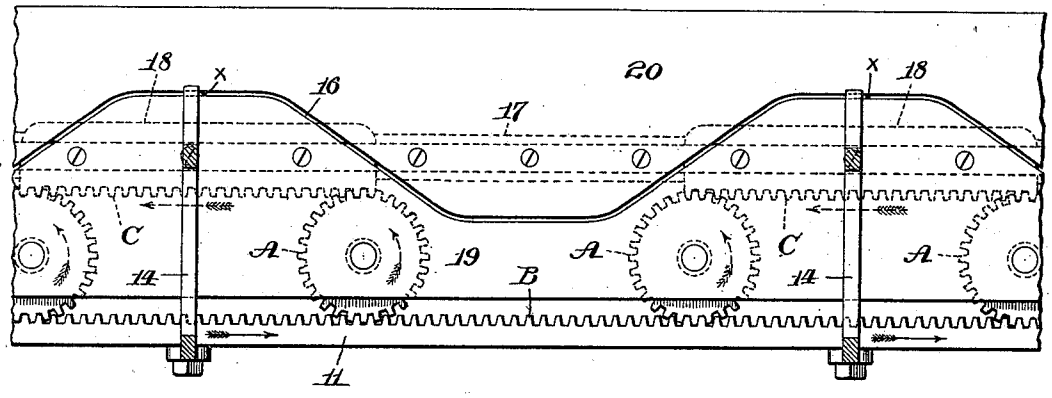


Fig. 5.

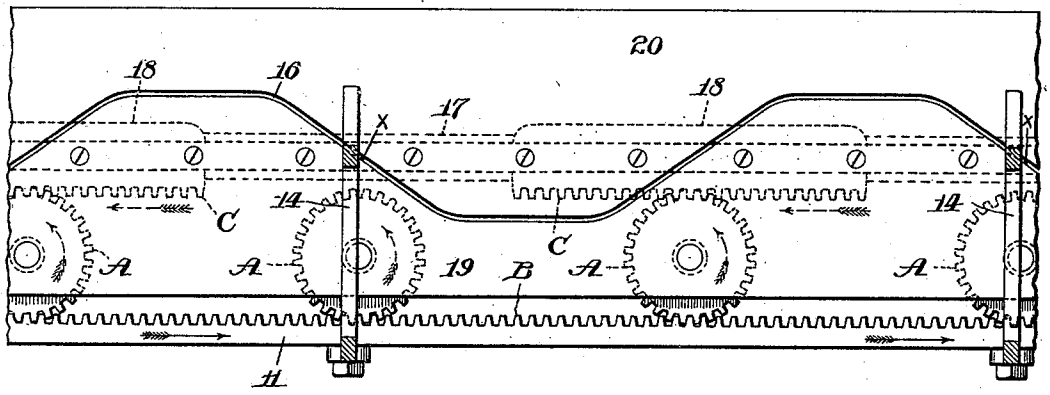
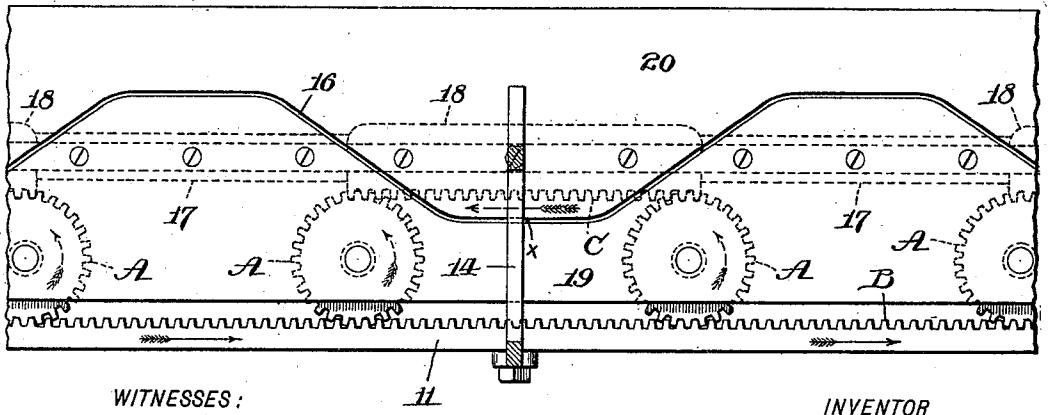


Fig. 6.



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UNITED STATES PATENT OFFICE.

ANDREW V. GROUPE, OF MOORE, PENNSYLVANIA, ASSIGNOR TO THE NATIONAL BRAIDER COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 642,977, dated February 6, 1900.

Application filed April 24, 1899. Serial No. 714,155. (No model.)

To all whom it may concern:

Be it known that I, ANDREW V. GROUPE, a citizen of the United States, residing at Moore, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Braiding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to braiding-machines of the character set out in my Letters Patent of the United States No. 588,421, dated August 17, 1897, to which reference may be had, my object herein being to provide a modified construction of bobbin-actuating mechanism whereby the threads from one set of bobbins may be directed under and over another set of bobbins in a manner to effect the plaiting together of the threads from the several bobbins for the purpose of forming a tube or cord of braid or a braided covering for a central core.

In my previous machine the mechanism for impelling the upper set of bobbin-carriers embodied a fixed camway, a series of rocking levers operatively connected therewith, provided with pins for engaging and disengaging each of said carriers at two different points at predetermined intervals, a spider carrying said levers, and means for rotating the spider. This construction, so far as concerned its operation, was entirely satisfactory. The objection thereto was mainly one of expense incidental to the multiplicity of parts employed and the requisite nicety of fitting and adjustment thereof. With the view, therefore, of overcoming this objection I have devised a simple and efficient construction and organization of mechanism whereby the upper-bobbin carriers are operatively impelled in respect to the lower-bobbin carriers and to the thread-guiding devices, all as will be hereinafter particularly described and claimed.

In the annexed drawings, Figure 1 is a sectional elevation of a braiding-machine embodying one form of my present invention. Fig. 2 is a full horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a plan of one of the upper-bobbin carriers and adjuncts. Figs. 4, 5, and 6 are diagrams of sections of the thread-course and upper-bobbin-actuating mechanisms, showing upper-bobbin carriers and thread-guides in different positions which they are caused to assume with relation to each other and to the thread-course during the braiding operation.

1 is the main frame of the machine; 10, a central tubular post rising from the bed-plate; 11, a spider or wheel rotatably mounted on said post, and 4 a driving-shaft carrying on its inner end a bevel-wheel 5, which gears with a similar wheel 6 on the hub of the spider or wheel 11, and thereby positively rotates the latter. On the under side of this spider or wheel are supported at intervals apart the lower thread-supplying bobbins 12, the threads from which are guided by suitably-located guide devices 14 on the said spider or wheel, and thereby directed to and through a sinuous course or camway 16, by means of which such threads are gradually raised and lowered during their rotary travel. This course or camway is formed by and between the lower and upper edges of two concentric rings 19 20, respectively, whereof the upper ring is fixed to the lateral uprights of the main frame and the lower ring to a spider or plate 21 on the upper end of the fixed central post.

17 is an annular trackway constituting a regular path on which run the upper-bobbin carriers 18. This trackway is secured on the inner faces of the rings 19 20 on a horizontal plane midway between the highest and lowest planes intersected by the undulations of the camway and is divided into sections on diagonal lines coinciding with the adjacent inclined portions of the camway, whereby the threads from the lower bobbins are directed under and over the said sections in alternate succession, all as fully set out in my previous patent above referred to.

The upper-bobbin carriers are rotated in a direction contrary to that of the lower-bobbin carrier in such manner that the threads from the lower bobbins are caused to pass under and over the upper carriers and their bobbins and effect the braiding of the several threads at or about the center of the machine.

The present invention pertains to improved means for impelling the upper-bobbin car-

riers, which means in the form illustrated will now be described in detail.

Arranged at regular intervals apart upon the inner face of the ring 20 is a series of pinions A, which extend through openings in the plate or spider 21 and mesh with a circular series of gear-teeth B at or near the periphery of the lower-bobbin carrier 11, whereby during the rotation of the latter the pinions are simultaneously rotated. The carrier 11 thus constitutes, in effect, a bevel gear-wheel. The lower edges of the upper carriers are provided with gear-teeth C, with which the said pinions are adapted to coact, and thus impel said carriers upon the annular trackway in a direction contrary to that of the lower-bobbin carrier.

In the construction herein represented there are twice as many pinions as there are upper carriers, which pinions are journaled adjacent to the respective inclines of the thread-course or camway 16. The distance between the centers of two adjacent pinions is slightly less than the length of a carrier, and the carriers are disposed at regular intervals apart and maintained relatively therein by the coacting pinions, with which they are necessarily engaged at all times. Hence the carriers are uniformly and continuously driven at a given speed in respect to the lower-bobbin carrier, the ratio of speed being such that during the depression and elevation of the threads in the inclines of the camway said inclines are free and unobstructed, the spaces between adjoining carriers 18 during such periods spanning the inclines successively, and thereby permitting the threads to be directed by the camway under and over the bobbin-carriers in alternate succession. This will be apparent by reference to Figs. 4, 5, and 6 of the drawings, wherein two carriers are indicated in several different positions which they progressively occupy in respect to the camway and the thread-guides. In these figures the directions of rotation of the carriers and the driving mechanism therefor are indicated by the adjacent arrows. It will be observed that in Fig. 4 the carriers are engaged with the underlying pinions in the spaces between the upwardly-converging inclines of the camway and that the threads (noted x) are being guided in the upper horizontal parts of the camway above the carriers, that in Fig. 5 the carriers are slightly advanced to clear the depressing inclines and the threads are being depressed in the latter so as to intersect the path of the carriers, and that in Fig. 6 the carriers are still farther advanced and the thread is drawn below the carrier, fully appearing. In the last-named figure it will be seen that the carrier spans the downwardly-converging inclines of the camway, that the underlying thread is midway between said inclines and directly below the middle of the carrier, and that, therefore, when the thread is advanced to the next succeeding or raising incline the adjacent end of the carrier will have cleared the latter and an open unobstructed course for the upwardly-moving thread will be had.

I wish it to be understood that while the particular number and disposition of the pinions or propelling devices herein shown and described are preferable, yet the same are not absolutely essential, as obviously a greater or less number may be employed, which would of course necessitate a rearrangement of the same in order to insure the proper propulsion of the carriers thereby in respect to the course of the threads from the lower bobbins. I would also add that my invention is not restricted to the use of the particular kind of propelling devices herein shown and described, as, for example, in lieu of toothed gearing plane frictional gearing might be used, nor is it confined to the precise mechanism herein shown and described for actuating the propelling devices, as obviously in the light of my invention other equivalent means may be employed for the purpose.

What I claim is—

1. In a braiding-machine, the combination with a sectional trackway, provided with threadways between adjacent sections and under and over alternate sections, carriers on said trackway, bobbins on said carriers, a second set of bobbins, a carrier therefor, actuating means for said carrier, a series of rotatable propelling means interposed between and directly engaged with the latter carrier and the carriers first named, and means whereby the threads from the last-named bobbins are directed between, under and over sections of the trackway in prescribed order, substantially as described.

2. In a braiding-machine, the combination of a sectional trackway provided with threadways between adjacent sections and under and over alternate sections, carriers on said trackway provided with gear-teeth, bobbins on said carriers, a second set of bobbins, a carrier therefor provided with gear-teeth, a series of pinions interposed between and geared with the latter carrier and the carriers first named, and means whereby the threads from the last-named bobbins are directed between, under and over sections of the trackway in prescribed order, substantially as described.

3. In a braiding-machine, the combination of a sectional trackway provided with threadways between adjacent sections and under and over alternate sections, carriers on said trackway provided with gear-teeth, bobbins on said carriers, a second set of bobbins, a series of pinions mounted at intervals apart adjacent to the trackway and adapted to gear with said carriers in continuous succession, means for rotating said pinions, and means for supporting and rotating said second set of bobbins, together with means whereby the threads from the latter bobbins are directed between, under and over sections of the

trackway in prescribed order, substantially as described.

4. In a braiding-machine, the combination of stationary members constituting a thread-guiding course, a sectional trackway, a set of bobbin-carriers on said trackway, their bobbins, a series of propelling devices rotatable each about its own axis and adapted to coact with said carriers, a second set of bobbins, supporting and actuating means therefor, and means for actuating said devices, together with means whereby the threads from said second set of bobbins are directed to the said course, substantially as described.

5. In a braiding-machine, the combination of two rings between which is formed a sinuous course, an annular trackway between the highest and lowest planes of, and intersected by, the course, thread-supplying devices on said trackway, other thread-supplying devices, mechanism for rotating the latter, a series of propelling devices rotatable each about its own axis and adapted to impel the first-named thread-supplying devices, and means for actuating said propelling devices, substantially as described.

6. In a braiding-machine, the combination of stationary members constituting a sinuous course, an annular trackway between the highest and lowest planes of, and intersected by, the course, thread-supplying devices on said trackway, pinions journaled on one of said members and engaged with said devices, a common gear coacting with said pinions, supporting and actuating means for said gear, bobbins connected with said gear, and thread-guiding means on said gear, substantially as described.

7. In a braiding-machine, the combination of two rings between which is formed a sinuous course, an annular trackway between the highest and lowest planes of, and intersected by, the course, thread-supplying devices on said trackway, other thread-supplying devices, mechanism for rotating the latter, pinions journaled on the lower ring at points adjacent to the respective inclines of said course, and operatively engaged with the first-named thread-supplying devices and with the mechanism for rotating the other thread-supplying devices, substantially as described.

8. In a braiding-machine, the combination of two rings between which is formed a sinuous course, a supporting-frame for the upper ring, a plate or spider for the lower ring, a fixed central post for said plate or spider, an annular sectional trackway between the highest and lowest planes of, and intersected by, said course, a series of bobbin-carriers provided with gear-teeth, a lower-bobbin carrier provided also with gear-teeth, and arranged below the said plate or spider, a rotary support for said latter carrier, and pinions journaled on the lower ring adjacent to the respective inclines of said course and adapted to coact with the successive carriers of the series and with the lower carrier, the said pinions extending through openings in the plate or spider, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

ANDREW V. GROUPE.

Witnesses:
WALTER C. PUSEY,
JOHN R. NOLAN.