E. F. PARKS & S. W. WARDWELL.

CARRIER FOR BRAIDING MACHINES.

APPLICATION FILED SEPT. 27, 1907.

962,522. Patented June 28, 1910.

2 SHEETS—SHEET 1.

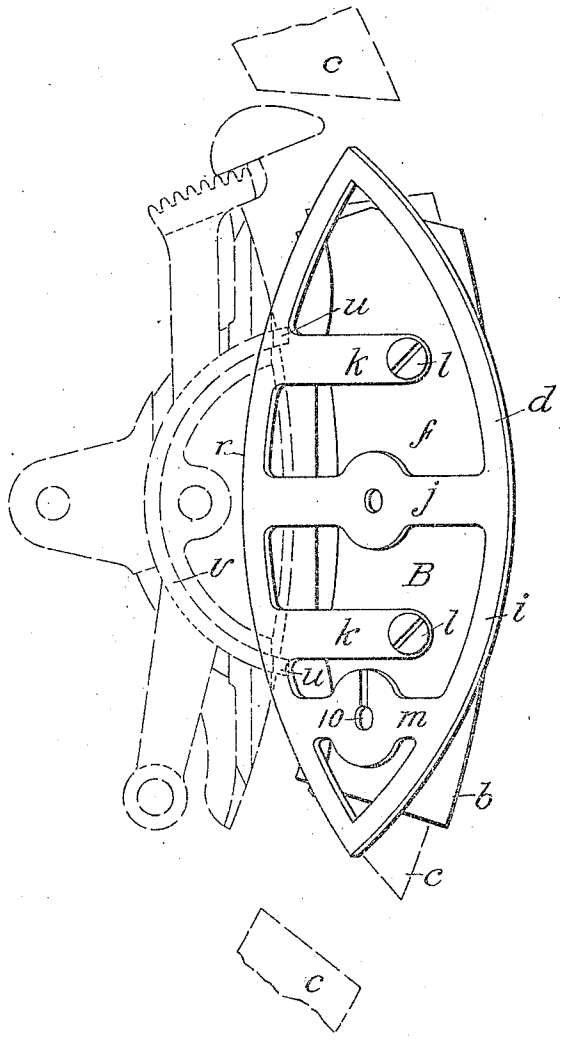

Fig. 1.

WITNESSES

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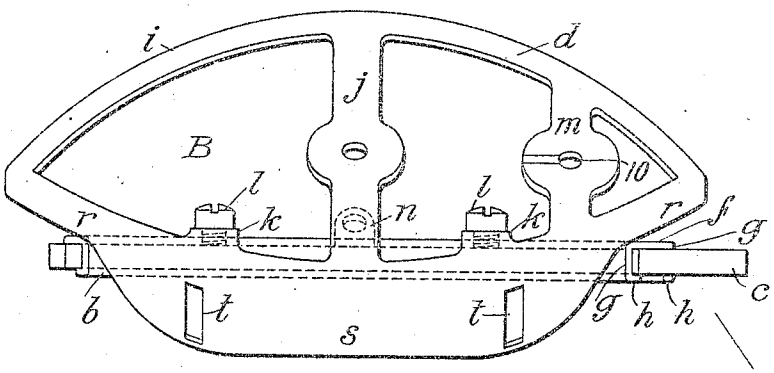

Fig. 2.

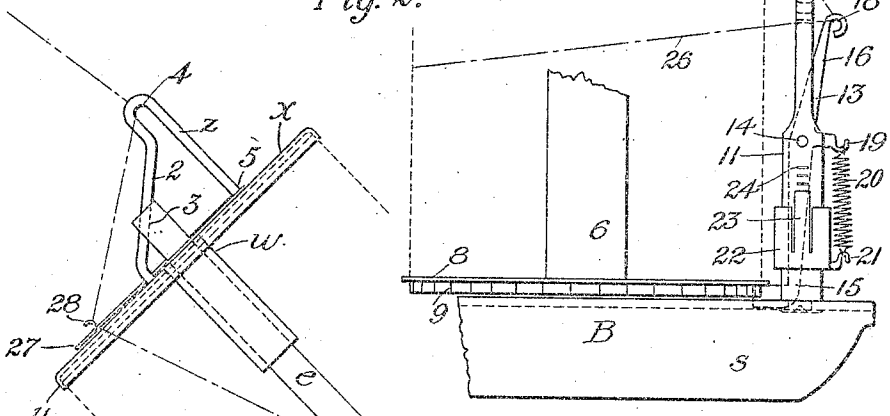

Fig. 4.

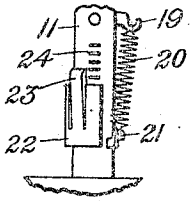

Fig. 5.

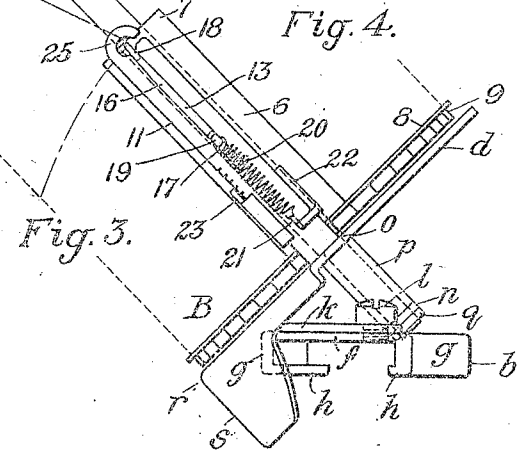

Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWARD F. PARKS AND SIMON W. WARDWELL, OF PROVIDENCE, RHODE ISLAND.

CARRIER FOR BRAIDING-MACHINES.

962,522. Specification of Letters Patent. Patented June 28, 1910.

Original application filed January 3, 1907, Serial No. 350,641. Divided and this application filed September 27, 1907. Serial No. 394,857.

To all whom it may concern:

Be it known that we, EDWARD F. PARKS and SIMON W. WARDWELL, citizens of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Carriers for Braiding-Machines, of which the following is a specification.

Our invention relates to braiding machines and particularly to the carriers for the yarn supplies, certain features of which are disclosed in our pending application, Serial No. 350641, filed January 3, 1907, from which the present application is divided.

The invention is fully set forth in the following specification, illustrated by the accompanying drawings, in which:

Figure 1 is a plan view of the carrier showing its relation to the track on which it runs and its driving connections illustrated by dash lines; Fig. 2, a side elevation; Fig. 3, an end elevation showing the spindle for supporting the supply cop and its connections; Figs. 4 and 5, details of the same.

The invention is applicable to that class of braiding machines in which the supplies are arranged in upper and lower tiers revolving in opposite directions about a common axis, the yarns from the lower supplies being caused to sinuate in their path of travel to pass them over and under the yarns from the upper supplies.

The invention comprises improvements in the form, construction and arrangement of the carriers for the upper supplies which are supported by and traverse a circular track rotating with the lower supplies.

In the drawings the carriers B are shown as preferably formed in two parts: the runner portion *b* designed to fit the segments *c* of the track and the deck portion *d* fastened to the runner and arranged to support the cop spindle *e*.

An important improvement in the construction of the carriers consists in forming them of sheet metal which effects lightness of structure and at the same time provides for cheapness in manufacture. It is especially desirable that the carriers be as light as possible consistent with strength since they are subject to the forces of momentum and centrifugal action in their rapid revolution about the axis of the machine. The machine of our previous application before referred to is capable of a speed of operation of five times that of the ordinary braiding machine, and it will be obvious that to attain this enormous increase in speed the operating parts must be designed to minimize weight, to overcome friction and at the same time provide for strength to resist the stress.

The runner portion *b* is of circular, arcual form, adapted to engage the track segments *c* which are of a flat, circular plane. The runner conforms to the shape of the track section, being formed to extend across the top, in the flat portion *f*, down the edges in the sides *g*—*g*, and bent up underneath in the extensions *h*—*h* which engage the under side of the track to prevent the carrier from lifting, see Figs. 2 and 3.

The deck portion *d* is made separate and secured to the runner *b* in any convenient manner. It has a lenticular contour pointed at either end, and adapted to act on the lower yarns which draw across its edges, as a wedge to deflect their course either inward or outward to pass them over the supply which the carrier supports and carries. In behalf of lightness, to avoid inertia and minimize momentum, the deck is preferably of skeleton structure, consisting of the rim *i* of lenticular contour, and a cross-tie *j* enlarged at its middle to form a boss to receive the spindle *e*. Two ears *k*—*k* are formed on the deck where the interior metal is cut away, and these are bent at an angle to secure the deck to the runner at the correct relative inclination for a purpose hereafter described. These ears are fastened to the deck in any suitable manner, preferably by means of screws *l*—*l* extending through them into the runner. A second cross-tie *m* is formed near one end of the carrier for the purpose of supporting the let-off device for the cop, to be later described.

An ear *n* is turned up from the top of the runner opposite the middle cross-tie of the deck, and in this ear and the cross-tie are alining holes to receive the end of the spindle *e*. The spindle is reduced at its lower end to form a shoulder *o* which abuts the top of the deck portion *d* and between the deck and the ear *n* is a collar *p* which surrounds the spindle and serves as a brace to stiffen and help support the deck which it abuts at its upper end. The spindle *e* extends through the ear *n* and has a washer

q driven onto its end to secure it in position, or it might be riveted in the ear, or threaded and screwed into it.

The edge *r* of the deck which is radially inward toward the axis of the machine is turned or formed downward to provide an engaging face *s* for the driving connections of the machine. In this face two apertures *t*—*t* are provided to receive the engaging ends *u*—*u* of the driver *v*, the latter of arcual form as represented by dash lines, Fig. 1, arranged to oscillate in a groove in the driving head, to engage the carrier first by one end and then by the other, as fully described in our application above referred to. The surface of the downturned edge *r* is inclined to the plane of the deck and the runner, to render it parallel to the course of the lower supply yarn as the latter passes between the carrier and the driving head, the latter not here shown.

The object of supporting the deck of the carrier in a plane inclined to that of the runner and the track or, in other words, inclined to the horizontal, is three-fold. First, it effects the inclination of the axes of the yarn supplies toward the braiding point above, so that the yarns have a direct course; second, it provides that the yarns from the lower supplies need only be deflected from their radially mean positions a minimum distance; (the general and most convenient form of supply cop is one having a diameter much less than its axial length and by arranging the upper supplies with their axes inclined toward the converging point of the yarns—that is, in a line with the radially mean positions of the yarns, the latter have only to be deflected a distance one-half of the diameter of the cop to pass them over or under the supplies;) third, and most important, this arrangement provides for equalizing the forces of gravity and centrifugal action. The inclination of the supply tends to cause gravity to offset centrifugal force when the supplies are revolved, thereby relieving the strain on the carrier and reducing its friction on the track so that wear is almost entirely eliminated. When it is considered that in the present machine the carrier carries a supply cop containing five times the amount of yarn usually carried in the supply, it will be appreciated that this provision for neutralizing or balancing the action of centrifugal force by gravity is most important.

A cap *x* is adapted to fit the spindle *e* and is preferably formed with a sleeve *w* which surrounds the spindle to provide a bearing of sufficient length to prevent play. The cap *x* is preferably of a diameter a little greater than that of the full supply cop or bobbin, and has a downturned rim *y* which is adapted to extend over and surround the edges of the cop. The cap *x* is held rotatively by means of a wire abutment *z* which extends upward in the inclined portion 2 which engages a recess or slot 3 in the end of the spindle and terminates in the guide loop 4, the opposite end of which is fastened at 5. The abutment *z* serves to prevent the cap from rotating with the supply-cop, but permits its removal to allow the cop to be placed on the spindle.

Adapted to rotate on the spindle at its lower end is the cop-holder 6 consisting of a sleeve 7 and a head or flange 8 formed with a ratchet wheel 9. The sleeve 7 is adapted to the diameter of the bore of the tube or bobbin on which the cop is wound and preferably fits snugly so that the sleeve and ratchet wheel rotate with the cop when the material is unwound. The sleeve might be provided with splines, teeth or other holding devices not here shown, but such are not generally required.

Fastened in the hole 10 of the cross-tie *m* is a post 11 which is preferably hollow or tubular and has within its walls a let-off lever 13 pivoted at 14, see Fig. 4. The lower arm 15 of the lever 13 projects outward through an opening at the bottom of the tube to engage the teeth of the ratchet wheel 9 to arrest its rotation, and the upper arm 16 extends through a slot 17 in the tube and is formed at its extremity with an eye 18. Midway of the extremities of the lever 13 is a hook 19 to which is fastened one end of a coiled spring 20 secured at its opposite end to a hook 21 extending from a sleeve 22 surrounding the post 11. The sleeve 22 is adjustable up and down the post 11 to regulate the tension of the spring 20, and is retained by a spring finger 23 which engages notches 24 in the post. By turning the sleeve 22 slightly, as shown in Fig. 5, the finger 23 is released from the notches, and the sleeve can be adjusted to the desired position. At the top of the post 11 is formed or fastened an eye or hook 25 through which the yarn 26 from the supply is led and thence it passes through the eye 18 of the lever 13 and up over the rim of the cap *x*. A spring wire 27 extends across the top of the cap and terminates in an eye or hook 28 adjacent the edge of the cap, which serves as a yielding guide for the yarn which passes from the eye 18 through this hook, and thence through the guide-loop 4 to the braiding point, see Fig. 3. As the yarn is taken up by the feeding action of the machine during the process of braiding, the tension on the yarn will cause the lever 13 to rock to release its lower end from the ratchet wheel 9, and allow the cop to turn to unwind the yarn and deliver it to the fabric. When the tension is released by the stopping of the machine or through breakage of the yarn, the spring 20 will act to return the lever 13 into engagement with the

ratchet wheel 9 to arrest rotation of the supply cop and prevent unwinding yarn not required. The adjustment of the spring 20 varies the tension on the yarn according to the required degree for different kinds of material and different varieties of fabric. The cap *x* is highly polished on its rim and the yarns draw across it without friction, being prevented from rubbing against the edge of the cop which would cause abrasion and breakage. A further object of the cap *x* is to provide for a constant relation of the yarns to the gathering or braiding point. The guide-loop 4 determines the angle at which the yarn from the upper supply leads to the braiding point and the relation of the yarn from the lower supply thereto is regulated by the cap *x* over which it draws, irrespective of the diameter of the supply cop. That is, the yarns will have the same relation to each other and to the braiding point notwithstanding the fact that the diameter of the cop diminishes as the yarn is taken off.

It will be seen that our invention provides a particular light yet strong structure, so balanced and arranged as to minimize the effect of momentum, inertia and centrifugal force to which it is subjected in operating at high speed, and also it comprises novel tension regulating means and yarn controlling and guiding devices.

We have described the device in detail as preferably constructed, but do not limit ourselves to the precise structure and arrangement shown, since certain modifications might be made without departing from the scope of our invention.

What we claim is:

1. In a carrier for a braiding machine, the combination with a runner of arcual form, of a skeleton deck formed of a separate piece and mounted on the runner at an angle to the plane of the runner, and a spindle having a bearing in the deck and extending between the deck and the runner and secured to the latter to provide a strut to brace the deck on the runner.

2. The combination in a braiding machine carrier, of a runner of arcual form adapted to slide on a circular track, a lenticularly shaped deck of skeleton structure having a rim and an intermediate brace extending between the sides of the rim, and a spindle extending through the brace and secured to the runner to serve as a strut between the deck and the runner.

3. In a carrier for braiding machines, the combination with an arcual runner of hollow form, having an upturned ear, of a skeleton deck of lenticular contour secured to the runner, having a tie portion with a hole alining with the ear on the runner, and a spindle having a bearing in said hole and secured to the said ear.

4. In a carrier for braiding machines, the combination with an arcual runner of hollow form, of a lenticularly formed deck secured to said runner, having a down-turned edge with apertures therein, for the purpose specified, and means for holding the yarn supply.

5. In a carrier for braiding machines, the combination with an arcual runner of hollow form, a lenticularly formed deck secured to said runner and inclined thereto, having a down-turned edge with apertures therein for the purpose specified, and means for holding a yarn supply.

6. In a braider carrier, the combination of a runner and a deck inclined thereto, and a spindle extending through the deck, the latter provided with means for directly engaging the driving means.

7. The combination in a braiding carrier, of a runner and a deck of sheet metal having a rim of lenticular form, a central cross-piece adapted for connection to a spindle, and tongues extending at an angle downward from one side of the rim to the runner.

8. In a carrier for braiding machines, the combination of a hollow runner formed of sheet metal, and a deck also of sheet metal of lenticular outline and tongues extending at an angle from the rim and secured to the runner.

9. In a carrier for braiding machines, the combination with a hollow runner, of deck portion formed of sheet metal with a rim of lenticular contour, tie-portions extending across the deck and tongues extending from the rim and bent to adapt them to secure the deck to the runner in an inclined position.

10. In a carrier for braiding machines, the combination with an arcual runner of hollow form, of a lenticularly formed deck secured to said runner and inclined thereto, having a downturned face formed substantially parallel to the path of travel of the yarn passing over it.

11. In a carrier for braiding machines, the combination of a spindle supported on the carrier, and a removable, circular cap adapted to cover the end of the supply package, held non-rotatably on the spindle and having guiding means for the yarn.

12. In a carrier for braiding machines, the combination of a spindle carried thereby having a slot, a removable cap fitted to the spindle and a yarn guide having its guiding portion eccentric to the cap and the spindle and having a portion to engage said spindle by its slot for the purpose and in the manner described.

13. The combination with a braider carrier, with a fixed spindle, of a supply holder secured to the spindle and rotatable thereon adapted to receive a detachable thread mass and provided with a ratchet, and a spring-

actuated pawl pivoted adjacent to the ratchet to engage the same and provided with a guide eye.

14. In a carrier for braiding machines, the combination with a rotatable supply holder, of a ratchet-wheel rotatable therewith, a post on the carrier, a pawl pivoted on the post and adapted to engage the ratchet, a sleeve adjustable on the post and a spring connecting the sleeve with the pawl for the purpose specified.

15. In a carrier for braiding machines, the combination with a rotatable supply holder having a ratchet-wheel, of a post on the carrier having indentations, a pawl pivoted on the post to engage the carrier, a sleeve slidable on the post and having a spring finger to engage the indentations, and a spring connecting the pawl and the sleeve, all in the manner and for the purpose specified.

16. In a carrier for braiding machines, the combination with a supply spindle, of a non-rotatable cap surmounting the spindle, a spring member having a guide eye adjacent the rim of the cap and a second yarn guide above the cap and eccentric to the spindle.

17. In a braider carrier for a machine with a circular track, the combination of a runner adapted to the circular track and a deck having a rim of lenticular outline and a cross-bar adapted to hold the spindle and connected to the runner at an angle thereto, and a spindle extending from the cross-bar.

18. In a carrier for braiding machines, the combination with a supply holder of a ratchet-wheel, a post on the carrier, a pawl pivoted on the post and adapted to engage the ratchet and having an eye engaged by the yarn delivered by the supply, and means to engage the pawl with the ratchet wheel.

19. In a carrier for braiding machines the combination with a supply holder, of a ratchet-wheel, a post on the carrier, a pawl pivoted on the post and adapted to engage the ratchet wheel and having an eye engaged by the yarn delivered by the supply holder, and a spring acting on the pawl to engage it with the ratchet.

20. In a carrier for braiding machines, the combination with a supply holder of a ratchet-wheel, a post on the carrier having an eye 25 to receive and guide the yarn delivered by the supply, a pawl pivoted on the post and adapted to engage the ratchet wheel and having an eye through which the supply yarn passes from its eye 25, a spring acting on the pawl to hold it in engagement with the ratchet wheel and to elastically resist action of the yarn, and means to adjust the tension of the spring.

21. In a braider carrier, the combination of a runner adapted to a circular track and a deck having a rim of lenticular outline and a cross-bar adapted to hold the spindle and connected to the runner at an angle thereto, and a spindle extending through the cross-bar and connected to the runner at its lower end.

22. In a yarn directing means for a braiding machine, the combination with yarn supplies delivering to a braiding point, of supply caps, and guides projecting upward from the top faces of the caps and within the confines of the said top faces.

23. In a yarn directing means for a braiding machine, the combination with yarn supplies delivering to a braiding point, of supply caps beyond the upper ends of the supplies and concentric therewith, and guides beyond the caps and eccentric thereto.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD F. PARKS.
SIMON W. WARDWELL.

Witnesses:
JOHN W. DEAN,
CHAS. A. EDDY.