Feb. 25, 1936. J. JABOULEY 2,031,655

TEXTILE MACHINERY

Filed Feb. 7, 1933

FIG_1_

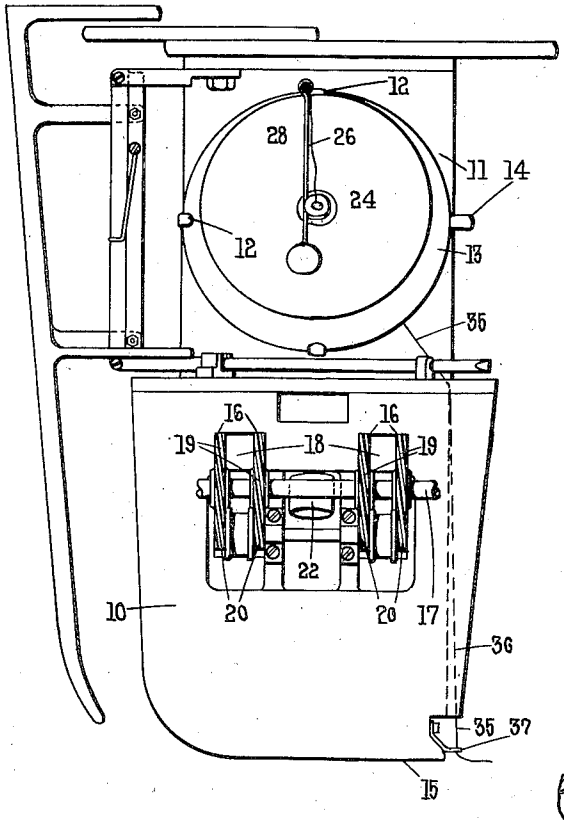


FIG_2_

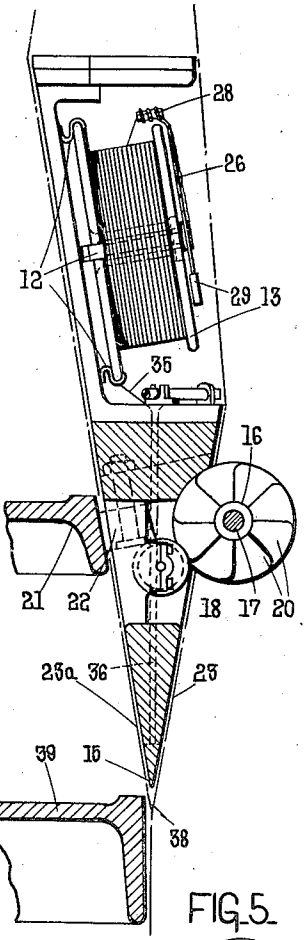


FIG_3_

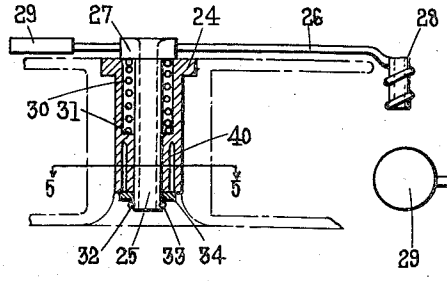


FIG_4_

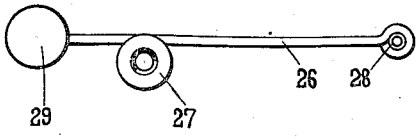
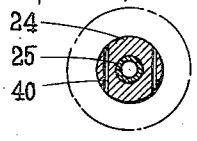


FIG_5_



Inventor:
Joanny Jabouley
by
Seltzer and Silverman
Attorneys

Patented Feb. 25, 1936 2,031,655

UNITED STATES PATENT OFFICE

2,031,655

TEXTILE MACHINERY

Joanny Jabouley, London, England, assignor, by mesne assignments, to Celanese Corporation of America, a corporation of Delaware

Application February 7, 1933, Serial No. 655,558
In Great Britain February 11, 1932

2 Claims. (Cl. 139—13)

This invention relates to circular looms, that is, looms in which the warps are arranged in a circle, and in which the weft is laid by means of a relative circular motion between the shuttle or shuttles and the warps.

In circular weaving, the greatest amount of fabric for any given diameter of loom is obtained by having the warps proceed cylindrically in the loom and as directly as possible to the cylinder of woven fabric, since then the diameter of the woven cylinder is commensurate with the overall diameter of the loom. Moreover, questions of easy driving and attendance require circular looms in practice to have a vertical axis (weaving proceeding preferably downwardly), in consequence of which the shuttles must be positioned vertically within the warp shed. With this arrangement, a flattish weft spool provides the maximum amount of weft which can be accommodated within the shed, the diameter of the spool being as great as the shuttle will permit.

The invention is concerned with effecting satisfactory unwinding of the weft in looms of this type, and the principal feature of the invention resides in the provision of a guide adapted to rotate about a substantially horizontal axis and balanced so as to move freely in leading the weft from the spool. The spool not being required to rotate, and the guide being easily movable under the pull of the weft, the weft is smoothly withdrawn and is not liable to be broken as weaving commences or to overrun when the loom stops.

A slight and uniform tension can be imparted by applying suitable braking to the guide. For example, the guide may be frictionally mounted about its pivot or acted upon by a light spring so as to receive the required braking effect. The amount of braking is preferably adjustable in order to meet the requirements of different sizes and/or types of weft.

The weft never being unduly tensioned at starting of the loom or during the unwinding, very fine wefts or wefts of comparatively low strength can be employed without danger of breakage.

The guide member is of such length that the weft is guided from the spool clear of the spool flanges. After passing through the eye, the weft is preferably drawn to a guide member situated in or substantially in the axis of the spool, and led therefrom to the fell of the cloth by suitable guide means provided in the shuttle.

The central guide member above-mentioned may be constituted by the hollow axis of the spool, the guide member rotating about this axis and the weft passing through the axis to the other side of the package.

The weft-unwinding device may be employed both in looms in which the shuttle or shuttles move within stationary or moving warps, and in those in which the shuttle or shuttles are stationary while the warps move, and is particularly suitable for use with the loom described in U. S. Patent No. 2,007,397.

The invention will now be described in greater detail with reference to the accompanying drawing which shows a weft unwinding device incorporated in a stationary shuttle which delivers the weft downwardly inside a shed constituted by rotating warps, the shuttle itself being utilized to effect beat-up.

The following description is given by way of example only and is in no respect limitative.

Fig. 1 shows the weft unwinding device attached to a spool mounted in a shuttle;

Fig. 2 is a part-sectional front elevation of Fig. 1;

Fig. 3 is a sectional elevation of the unwinding device removed from the spool;

Fig. 4 is an elevation of the weft unwinding device as it appears on the face of the spool; and

Fig. 5 is a sectional view along line 5—5 of Fig. 3 in the direction of the arrows.

In Fig. 1 is shown one of any convenient number of shuttles 10 which are mounted substantially vertically between the sheet of warps. Each shuttle 10 carries a frame 11 to which are attached clips 12 adapted to grip the inner flange of a weft spool 13 which is thus held with its axis substantially horizontal in the upper part of the shuttle 10. One of the clips 14 has an extended lug adapted to be pressed backwards to enable the spool to be withdrawn sideways from the grip of the other clips 12 when required to be replaced by another spool. The edge 15 of each shuttle 10 tapers to a narrow width and rests on the fell of the cloth 38 at about the level of the upper edge of a ring 39 inside the loom where the shuttle serves to beat up the weft laid by a preceding shuttle. The shuttles 10 are held in position within the warp sheds by means of vane wheels 16, 16 mounted on rotatable shafts 17 outside the warps and extending into recesses 18 (Fig. 2) within the shuttle bodies below the spools 13. The shafts 17 are rotated at a suitable speed by gearing connected to the drive of the loom (not shown) so that as the rotating outer sheet of warps 23 meets the vane wheels 16 the warps pass through the spaces 19

between the vanes **20** and so have a substantially uninterrupted motion while the shuttles **10** are held stationary.

The shuttles are also supported from the inside of the warp circle by means of a disc **21** whose outer edge presses against a roller **22** freely mounted on a substantially vertical axis in the shuttles **10**, the inner sheet of warps **23***a* passing between the disc and the rollers uninterruptedly.

The spool **13** is bored centrally from front to rear to receive a bushing **24**, (Fig. 3) which forms a bearing for a hollow spindle **25** of a weft unwinding device. The device comprises a light wire arm **26** which is integral with or secured to a flange **27** at one end of the hollow spindle **25**. The wire arm **26** carries at one extremity a guide eye **28** through which the weft is led, and at the other extremity a balance weight **29**. The guide eye **28** extends beyond the outer flange of the spool **13** so as to prevent chafing of the weft thread **35** against the outer flange and may be of porcelain, glass, or other suitable material. The guide eye **28** is gripped in a coil formed by the extremity of the guide arm **26**.

The bore of the bushing **24** is of larger diameter nearer the upper extremity of the bushing to provide a housing for a light coil spring **30** which encircles the hollow spindle **25** and is restrained by the flange **27** of the hollow spindle **25** and the shoulder **31** at the inner end of the enlarged bore of the bushing **24**. The spindle **25** is held in position against the action of the spring **30**, which provides a slight resistance to rotation of the arm **26**, by means of a circular locking spring **32** bearing against a washer **34** and fitting into a groove **33** round the end of the spindle **25**. The bushing **24** is slotted at **40** (Figs. 3 and 5) and sprung to grip the bore of the spool on being pushed into position.

In operation, the weft thread **35** is led from the spool through the guide eye **28** of the unwinding device clear of the spool flange and through the hollow spindle **25** to the opposite side of the spool from where it is led by means of a channel **36** in the body of the lower part of the shuttle to an eye **37** at the rear end of the bottom edge of the shuttle and so into the shed formed by the warp threads **23**. If desired, the weft thread **35** on passing from the hollow spindle **25** may be led to the channel **36** across the face of the rear flange of the spool. In order to prevent unnecessary friction between the weft thread and the arm **26**, the arm **26** is off-set with respect to the axis of the hollow spindle **25**, as shown in Fig. 4.

As the weft unwinds from the stationary spool, the rotary unwinding motion overcomes the resistance to rotation of the arm **26** and causes it to rotate about its axis. The resistance offered to the hollow spindle **25** by the spring **30** controls the tension of the weft in course of unwinding and also prevents over-running of the unwinding mechanism and consequent inconvenience on starting the loom after stoppage. This resistance can be adjusted by varying the compression of the spring **30** or by the use of springs of different strength.

The beat-up of the weft thread is effected by pressure of the narrow edge **15** of each shuttle **10** upon the weft laid in the bottom of the warp shed by the preceding shuttle, the warp threads being crossed to form a new shed between the shuttles.

What I claim and desire to secure by Letters Patent is:—

1. A shuttle for a circular loom of the type described, said shuttle comprising a flat flanged weft spool having a central bore, a spindle rotatably mounted within said bore, a balanced guide arm secured to one extremity of said spindle and lying close to one flat side of the spool, said balanced guide arm being adapted to rotate about said spool and to unwind weft therefrom, and means disposed within said bore and adapted to co-operate with said bore and said spindle to control the rotation of said guide arm and thereby to impart substantially constant tension to the weft as it is unwound from the spool by the guide arm.

2. Apparatus according to claim 1, wherein the spindle is formed with a flange, and the means disposed within the bore and adapted to cooperate with the bore and the spindle to control the rotation of the guide arm comprises a compression spring which encircles the spindle and presses against the flange formed thereon.

JOANNY JABOULEY.