





# UNITED STATES PATENT OFFICE.

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## TWISTING-FRAME.

No. 846,605.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, FRANCIS A. PAIGE, a citizen of the United States of America, and a resident of Central Falls, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Twisting-Frames, of which the following is a specification.

My invention relates more particularly to improvements in "wet-twisting" frames, so called, that is machines for feeding from suitably-mounted bobbins a plurality of threads or yarns through a water-bath and from the latter to and between rolls and to the twisting-spindles.

While the invention relates in general to the class of machines just referred to, it has more especial relation to improvements in means for actuating the traverse-rod, in which the thread-guides are mounted.

In wet-twisting machines as usually devised the brass-wire yarn-guides thereof are subjected to considerable wear at the points or places where the traveling yarns bear. In fact, owing to such excessive wear the life or durability of the guides is materially shortened, thereby requiring frequent renewals. Even in machines employing short-stroke slowly-reciprocating traverse-rods the action of the traveling yarn produces lateral grooves in the guides. Another objection to such former yarn-guiding devices is that upon substituting and feeding coarser yarns therein the previously-produced finer grooves formed in the guides operate to abrade and wear the yarn itself, thus necessitating frequent stopping of the machine.

The object I have in view is to wholly overcome in a simple and inexpensive manner all the objections or disadvantages above referred to.

To that end my invention consists, essentially, in imparting a short angular movement to the continuously-reciprocating guide-carrying traverse-rod, so that the wear upon the guides caused by the traveling yarn is distributed over a much larger surface, the result being to greatly increase the durability and efficiency of the guides and also preventing the cutting of grooves therein.

In the accompanying sheet of drawings, Figure 1 is a plan view, in partial section,

representing a portion of a wet-twisting frame embodying my improvement. Fig. 2 is a transverse sectional view taken on line  $xx$  of Fig. 1 and also through the gear-case, &c.; and Fig. 3 is a partial side elevation, the rolls and gear-case being omitted.

In the drawings the water-holding vessel or basin  $e$ , supported by brackets or stands  $e'$ , the stationary glass rod  $f$ , mounted in the basin, the driven front roll  $a$ , the independent top or weight rolls  $b$ , and the supporting-frame therefor are or may be constructed and arranged substantially as usual.

At a point in front of and near the upper edge of the water-holder  $e$  the movable longitudinally-extending traverse-rod  $c$  is mounted in suitable fixed bearings  $d$ . To the forward end of said rod, as drawn, is secured a member  $u$  of a coupling, in turn jointed to another member  $u^2$ , jointed to an end of the reciprocating link or pitman  $r$ , the arrangement thus described forming a swing-joint at  $u'$ . To the rod  $c$  are secured suitably-spaced yarn-guides  $g$ , each having a vertically-elongated open eye  $g'$ , Fig. 2, between and against the two sides or members of which the yarn travels after passing from the submerged rod  $f$  and the water-bath. At suitable intervals longitudinally of the traverse-rod are fitted elongated vertical pintles  $o$ , (one only being represented in the drawing,) on each of which a spool  $n$  is loosely mounted.

The following describes the means represented for slowly imparting short reciprocating movements to the traverse-rod  $c$ : The front end of the shaft  $a'$  of the positively-driven roll  $a$  has a worm  $a^2$  meshing into the teeth of a corresponding wheel or gear  $s$ , secured to the short horizontal shaft  $s'$ , revolvably mounted in the lower portion of the gear-case  $h$ . (See also Fig. 2.) Said shaft  $s'$  in turn actuates a suitable gear-train  $T$ , the upper and larger gear  $t$  thereof having a crank-pin  $r'$  secured thereto, carrying the said connecting-rod  $r$ , jointed to the corresponding member  $u^2$  of the coupling. Thus it is clear that the rod  $c$  is adapted to be moved endwise back and forth in an intermittent manner in its bearings  $d$ , the yarn-guides  $g$  at the same time being simultaneously actuated a like distance, whereby each guide causes its continuously-traveling



thread or yarn to traverse between the adjacent faces of the respective top rolls *b* and the bottom or live roll *a*.

Contiguous to and adapted to engage with each of the said spools *n* is located a normally stationary arm member *m*, the same being arranged at a suitable angle to the respective spool and terminating in an elongated base having holes through which pass holding-screws *m'*, tapped into the usual rail *m<sup>2</sup>*, which in turn supports the said weight-rolls *b*, all as clearly indicated in Fig. 1.

As thus constructed and mounted it will be apparent that while the guide-carrying or traverse rod *c* is being slowly reciprocated, as before described, it (the rod *c*) will, through the medium of the fixed arm *m* and its slidable spool *n*, have a correspondingly slowly oscillating or angular movement imparted to it. The arrows indicate the direction of the movements immediately following the action of the connecting-rod *r* from the position shown—that is to say, when the parts are in the position represented in the drawings the guides *g* are fully depressed (see Fig. 2) and are gradually swung upwardly therefrom to the extreme elevated position (indicated by dotted lines in Fig. 2) during the advance half-stroke movement of the member *r*. While the joint action of the parts is thus taking place the engagement of the spool with the fixed arm *m* will cause the former to rise a short distance on its pintle *o* corresponding to the degree of angular movement imparted to the traverse-rod. Upon the return stroke the rod, guide, &c., will again resume the normal position shown, thus completing one revolution of the crank-gear *t*. I would add that the degree of said angular movement of the rod *c* may be readily varied or adjusted at will by simply changing the position of the arm *m* after first loosening the fastening bolts or screws *m'*.

By means of the improved construction and arrangement just described it will be apparent that the intermittently-continuous combined longitudinal or axial and angular movements of the traverse-rod *c* and its yarn-guides *g* will operate not only to move the rapidly-traveling yarns *y* laterally back and forth along the glass rod *f*, located in the bath, but at the same time the device will operate to swing the guides in vertical planes, thereby continuously changing the relative contact-points, the degree of said movements, however, not being sufficient to bring the bottom of the loop or eye portion *g'* of the guide members into engagement with the yarn.

It is of course to be understood that the inner adjacent sides or surfaces of the two legs forming the loop or eye portion of each guide alternately engage the strand of traveling

yarn threaded through the eye, and since the latter is continuously changing its position vertically with respect to the yarn no appreciable wear or cutting of the wire is produced. Consequently the yarn is operated upon with materially less friction and in a more even manner, while the durability of the guides is greatly increased.

While my improvement is well adapted to be employed in "wet-twisting" frames, so called, it is obvious that without departing from the spirit of the invention the device may be used in twisting-frames of different types wherein the bath is omitted.

I claim as my invention and desire to secure by United States Letters Patent—

1. In a machine of the character described, the combination of a horizontally-disposed traverse-rod, yarn-guides secured thereto, means operatively connected with said rod for intermittently reciprocating the latter in a rectilinear path, and mechanism for oscillating the rod and guides during said reciprocating movements.

2. In a machine of the character described, a horizontally-mounted traverse-rod, a plurality of suitably-spaced yarn-guides rigidly secured thereto, means for imparting a reciprocatory endwise movement to said rod, and means for turning the latter a short angular distance while it is being reciprocated, substantially as described and for the purpose set forth.

3. In a machine of the character described, the combination with a tank or vessel for containing water and a guide-rod mounted therein, of a horizontally-arranged traverse-rod located contiguous to said vessel, a plurality of yarn-guides secured to the traverse-rod, the free end or eye portion of the guides extending into said vessel, means for reciprocating said traverse-rod in a rectilinear path, and means coöperating with the last-named rod for slowly oscillating it, whereby the position of the guides with respect to the yarn being acted upon is continually changing.

4. In a machine of the character described, the combination with a guide rod or member and revoluble rolls, of a plurality of suitably-mounted yarn-guides located intermediate said guide-rod and rolls, and means for intermittently reciprocating the yarn-guides and at the same time moving them in planes at an angle to that in which they are reciprocating.

5. In a machine of the character described, a movable rod or member, a plurality of guides secured to said rod, each guide having an eye or loop for the passage of yarn, means for intermittently reciprocating said members in a horizontal plane, and means for imparting a limited degree of angular move-



ment to the guides while they are being reciprocated in said plane.

6. In a machine of the character described,  
the combination of a traverse bar or member,  
5 a plurality of suitably-spaced yarn-guides secured thereto, means for intermittingly reciprocating said rod and its guides, suitably-located adjustable stationary arms, and devices mounted on said traverse-bar arranged

to cooperate with said arms, whereby a rocking or swinging movement is imparted to the traverse-bar and its guides.

Signed at Providence, Rhode Island, this  
24th day of July, 1906.

FRANCIS A. PAIGE.

Witnesses:

GEO. H. REMINGTON,  
C. E. INCE.