

May 14, 1929.

S. BOROVY ET AL

1,713,326

TWISTER FRAME

Filed April 12, 1927

2 Sheets-Sheet 1

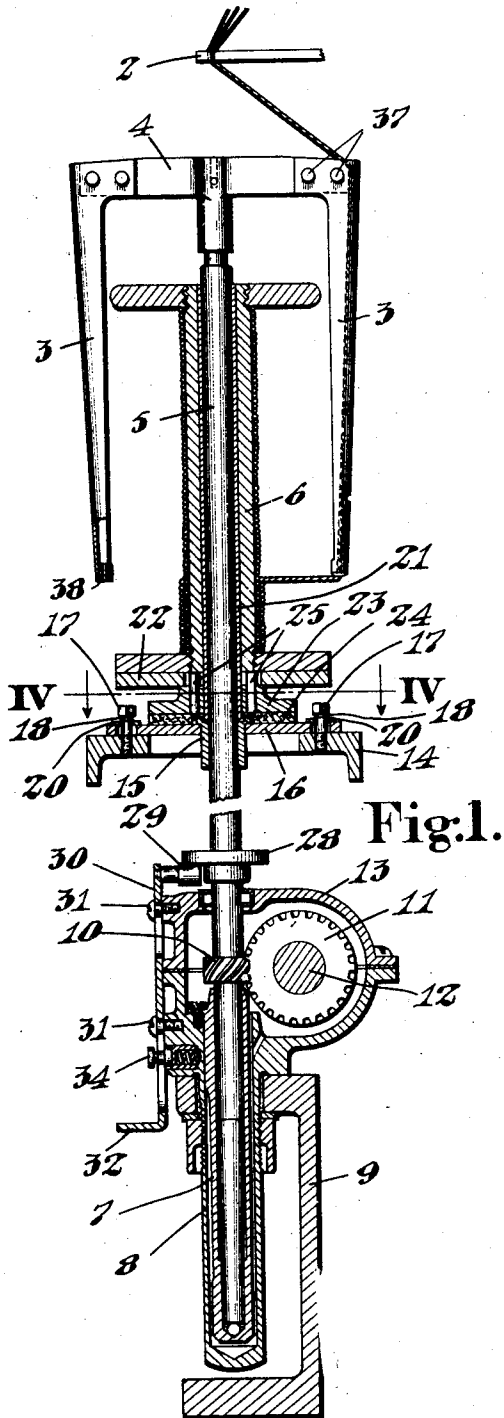


Fig. 1.

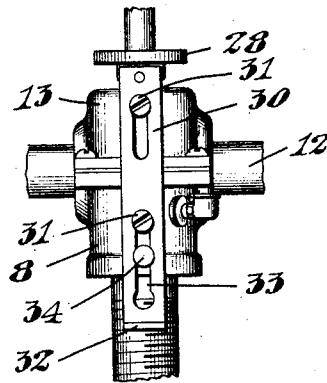


Fig. 2.

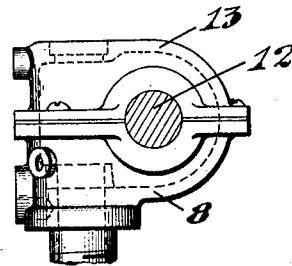


Fig. 3.

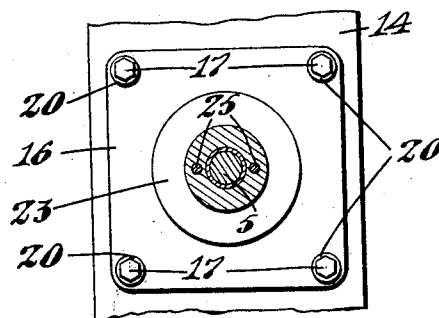


Fig. 4.

INVENTORS

Samuel Borovoy
Walter L. Perry
J. A. McCready
Attorneys

May 14, 1929.

S. BOROVY ET AL

1,713,326

TWISTER FRAME

Filed April 12, 1927

2 Sheets-Sheet 2

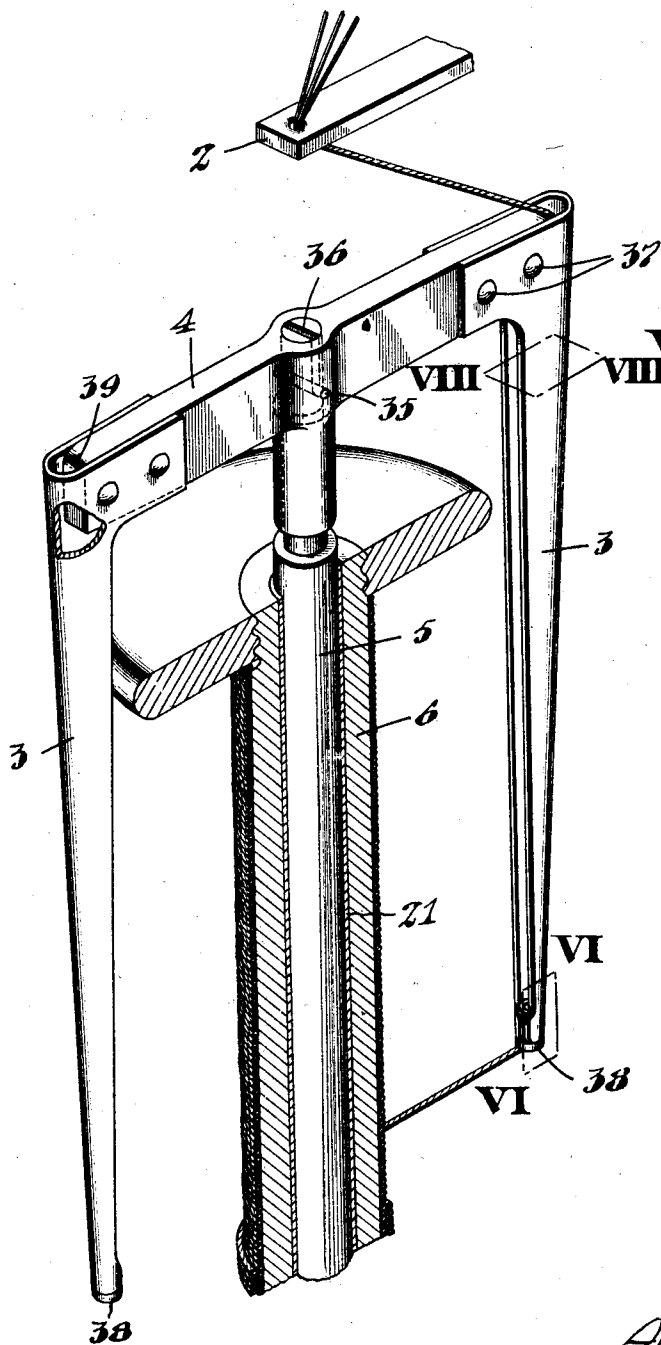


Fig. 5.

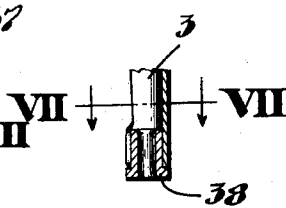


Fig. 6.



Fig. 7.

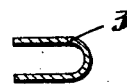


Fig. 8.

INVENTORS

*Daniel Borovoy
Winthrop R. Peck,
By J. H. McCurdy
their Attorney.*

UNITED STATES PATENT OFFICE.

SAMUEL BOROVY AND WINTHROP L. PERRY, OF LOWELL, MASSACHUSETTS, ASSIGNORS TO SACO-LOWELL SHOPS, OF LOWELL, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

TWISTER FRAME.

Application filed April 12, 1927. Serial No. 183,200.

This invention relates to twist-ers of the flier type.

It is the general object of the invention to improve machines of this type with a view to increasing their production, and especially to increasing the speed at which such machines can be operated. In attempting to drive a machine of this type at high speeds, it has been found that the fliers cannot withstand the stresses set up in them by centrifugal force. Excessive vibration of the spindle also occurs, and this fact may contribute in some measure to the breakage of the fliers. The present invention therefore aims to devise a flier which can be operated at high speeds but which still can be manufactured economically. It is a further object of the invention to improve the mounting of the spindles with a view to eliminating excessive vibration and devising a construction which will operate smoothly at substantially higher speeds than those used commercially heretofore.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a vertical, cross-sectional view, partly in elevation, showing a spindle and flier construction embodying this invention;

Fig. 2 is a front view showing the spindle lifter and parts associated therewith;

Fig. 3 is a side view, partly in cross-section, showing part of the housing for the spindle bolster and the driving gears therefor;

Fig. 4 is a cross-sectional view on the line 4—4, Fig. 1;

Fig. 5 is a perspective view on a larger scale showing the construction of the novel flier provided by this invention;

Fig. 6 is a vertical, cross-sectional view on the line 6—6, Fig. 5;

Fig. 7 is a transverse, cross-sectional view on the line 7—7, Fig. 6; and

Fig. 8 is a transverse, cross-sectional view through the flier arm on the plane indicated at 8—8, Fig. 5.

The invention has been shown in Figs. 1 to 4, inclusive, as embodied in a construction adapted especially for twisting together two or more strands of material to form a heavier

strand or cord, the particular mechanism shown being designed for use in the production of cord which is to be woven into tire fabric. The invention is, however, obviously adapted for many other uses. As shown, the strands of material are led through the eye of a thread guide 2 to one arm 3 of a flier which is mounted on the upper end of an upright spindle 5. The thread passes through an eye in the lower end of the arm 3 and travels to a spool 6 on which it is wound in a manner well understood by those skilled in this art.

The lower end of the spindle 5 is rotatably mounted in a bolster 7, Fig. 1, which is supported in a bolster casing or housing 8. This casing is mounted in a stationary spindle rail 9. For the purpose of driving the spindle, a spiral gear 10 is secured thereto and is driven by another spiral gear 11 fast on the driving shaft 12. This shaft extends the entire length of the machine and drives the entire series of spindles in the frame. An upper casing section 13 cooperates with the casing 8 to enclose the gears 10 and 11.

The spool 6 is mounted on a bobbin rail 14 which is transversed up and down during the operation of the machine in order to wind the thread or cord evenly on the spool. As above stated, excessive vibration of the spindle is likely to occur when it is driven at high speeds. We have found, however, that the spindle can be made to run smoothly by providing a guide bearing for it and mounting this bearing on the bobbin rail 14. As shown, this bearing comprises a bushing 15 in which the spindle 5 has a running fit, and this bushing is supported in a bushing plate 16 which lies on the upper surface of the bobbin rail 14. The plate is not mounted rigidly on the rail but is so supported that it can yield laterally, this yielding movement, however, being frictionally resisted. For this purpose four holes are drilled through the bushing plate to receive screws 17, the holes being considerably larger in diameter than the screws so that the plate can have considerable lateral movement with reference to the screws. A spring 18, Fig. 1, is located immediately under the head of each screw 17 and bears on a washer 20 through which the screw projects, this washer resting on the upper surface of the bushing plate 16. The bearing bushing 15 projects through a relatively

large aperture formed in the bobbin rail 14, and the mounting of the bushing plate, as just described, while permitting a lateral movement of the spindle, nevertheless op-
 5 poses sufficient resistance to such movement to steady the spindle and prevent objectionable vibration.

Interposed between the spool or bobbin 6 and the spindle 5 is the usual tube 21. The
 10 bobbin base rests on a disk 22 which is supported by another disk 23 resting on a washer or disk 24, preferably of fibre, the disk 23 having two pins 25—25 which project into slots in the disk 22.

15 If a thread should break, or if for any other reason it should be desired to stop the rotation of an individual spindle, this may be done by raising the spindle far enough to carry the gear 10 out of mesh with its driving
 20 gear 11. For this purpose a collar 28, Figs. 1 and 2, is secured on the spindle just above the housing 13 and is arranged to be engaged by a roll 29 which is mounted on the upper end of a slide 30. This slide is guided on screws
 25 31—31 and has an outwardly turned lower end 32 by means of which it may be lifted. The lower screw 31 works in a key-hole slot 33, and when the slide has been raised far enough to effect the stopping of the spindle,
 30 it is locked in this position by a spring pressed catch 34 which snaps out into the lower enlarged part of the slot 33. Thereafter this spindle is held out of action until the filling of the bobbins has been completed and the frame
 35 is shut down for doffing.

Referring now to Figs. 5 to 8 which show in detail the construction of the flier, it will be observed that the flier head 4 consists of a flat
 40 bar of metal expanded at its central portion to provide room for the hole which receives the upper end of the spindle. A pin 35 is set into the head and extends transversely through the hole, while the upper end of the spindle is provided with a slot 36 to receive
 45 this pin. The flier thus is driven positively through this pin and revolves in unison with the spindle.

Each flier arm 3 is made of resilient sheet metal of substantially uniform thickness and
 50 is U-shaped in transverse cross-section, as clearly shown in Figs. 5 and 8. This arm may be made from flat stock by a relatively simple folding operation, and it is then secured to the head 4 by rivets 37, the end of the head
 55 being slipped in between the flanges at the upper end of the arm. Preferably the arm is made of spring tempered sheet steel, and the flanges of the arm extend toward the axis of rotation of the flier and lie parallel to a radial plane passing through said axis. The
 60 arm is relatively wide adjacent to the head 4 and tapers rapidly toward its free or lower end. This construction is very strong and rigid while at the same time being very light
 65 in weight, and it has been demonstrated in

practice that it will operate successfully at speeds far above those which would ruin
 fliers of prior constructions. The manufacturing operations are relatively simple so that
 the expense of manufacture is very reason- 70
 able.

The lower end of each arm is provided with a thread guiding eye 38 which may conveniently be made of hardened steel or other
 metal. At this end the flanges of the arm are 75
 rolled into substantially the form of a split tube, and the eye is frictionally gripped in this tubular member. At the point where the thread or cord enters the arm it is preferable to round off and groove the head, as shown at
 80 39, Fig. 5, to provide smooth surfaces for the travel of the thread.

It has been demonstrated in practice that this spindle and flier can be operated at speeds
 so much higher than those heretofore found 85
 practical, that a very substantial increase in production is effected. While the flier has been above described with particular reference to the requirements of the mechanism
 shown, it will be understood that it is also ca- 90
 pable of use in machines of other types.

While we have herein shown and described the best embodiment of our invention that we
 have so far devised, it is contemplated that the invention may be embodied in other forms 95
 without departing from the spirit or scope thereof.

Having thus described our invention, what we desire to claim as new is:

1. A flier comprising a head adapted to be 100
 mounted on a spindle, and a sheet metal arm secured thereto, said arm consisting of spring tempered sheet steel of approximately uniform thickness and being of U-shape in
 transverse cross-section with the flanges 105
 thereof extending toward the axis of revolution of the flier, said arm being relatively wide adjacent to said head and tapering gradually toward the free end thereof.

2. A flier comprising a head provided with 110
 a hole adapted to receive the upper end of a spindle, and an arm made of resilient sheet metal of substantially uniform thickness with its upper end embracing one end of said head and secured thereto, said arm being of U- 115
 shape in transverse cross-section with its flanges extending toward the axis of rotation of the flier, said flanges being relatively wide adjacent to said head but tapering gradually toward the free end of the arm. 120

3. In a mechanism of the character described, the combination of an upright spindle, a bolster in which said spindle is supported, a flier mounted on the upper end of
 said spindle, said spindle being adapted to 125
 receive a spool immediately below said flier, and a guide bearing affording yielding lateral support to said spindle at a point adjacent to the lower end of the spool.

4. In a mechanism of the character de- 130

scribed, the combination of an upright spindle, a bolster in which said spindle is supported, a bobbin rail above said bolster having an aperture through which said spindle projects, a guide bearing for laterally supporting said spindle in the neighborhood of said rail, and means carried by said rail for supporting said bearing for yielding movement laterally with reference to the spindle.

5. A flier comprising a head adapted to be mounted on a spindle, and a substantially straight sheet metal arm secured to one end of said head, said arm being of U-shape in cross-section with the flanges thereof extending approximately parallel to a radial plane passing through the axis of revolution of the flier, and a thread guide mounted in the lower end of said arm.

6. A flier comprising a bar-like head adapted to be mounted on a spindle, and an arm secured to and extending from said head, said arm being made of resilient sheet metal

and of U-shape in cross-section with the flanges thereof extending approximately parallel to a radial plane passing through the axis of revolution of the flier, said head being secured between the flanges of said arm and the arm being relatively wide adjacent to said head but tapering gradually in width toward the free end thereof.

7. A flier comprising a head adapted to be mounted on a spindle, and an arm secured to and extending from said head, said arm being made of resilient sheet metal and of U-shape in cross-section with the flanges thereof extending toward the axis of revolution of the flier, said arm being relatively wide adjacent to said head and tapering gradually toward the free end of the arm.

In testimony whereof we have hereunto signed our names to this specification.

SAMUEL BOROVOY.
WINTHROP L. PERRY.