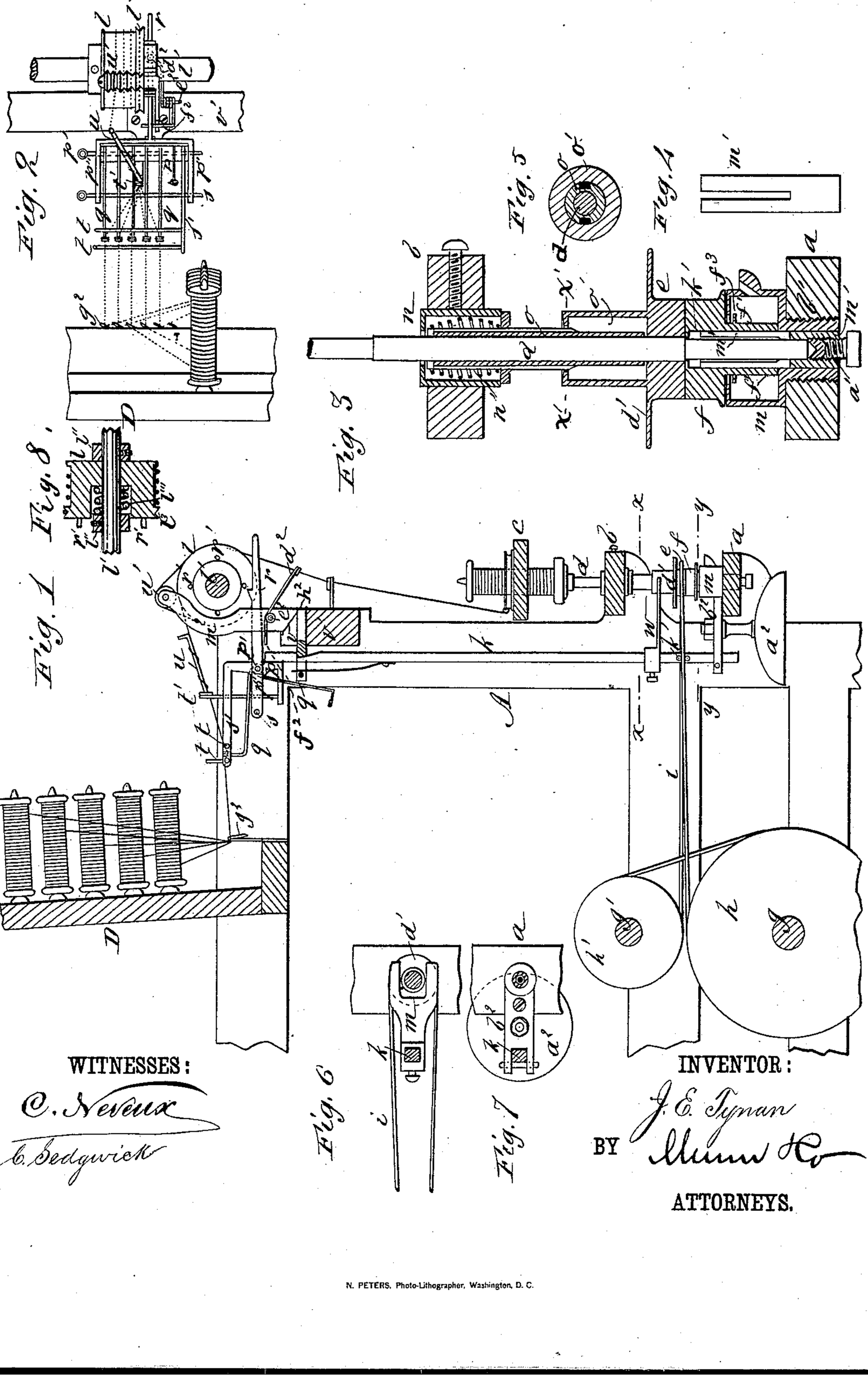
(No Model.)

J. E. TYNAN.

MACHINE FOR DOUBLING AND TWISTING SILK AND OTHER THREADS.

No. 326,530. Patented Sept. 15, 1885.



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

J. E. Tynan

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

MACHINE FOR DOUBLING AND TWISTING SILK AND OTHER THREADS.

SPECIFICATION forming part of Letters Patent No. 326,530, dated September 15, 1885.

Application filed October 12, 1882. Renewed October 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. TYNAN, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and Improved Machine for Doubling and Twisting Silk and other Threads, of which the following is a full, clear, and exact description.

My improvements relate to machines for doubling and twisting silk and other threads in the manufacture of what is known as "tram" and all varieties of twist, in which the threads are fed from the spools or bobbins, doubled, and then twisted or spun.

The invention consists in certain novel features of construction of the feeding and stop mechanism, and in the construction and arrangement of the spindles, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a transverse vertical section, part in elevation, of a portion of a doubling and twisting machine of my improved construction. Fig. 2 is a plan view of the bobbin-board, the thread-doublers, the feed mechanism, and the stop-motion. Fig. 3 is an elevation of a portion of a spindle, showing some of its accessories in transverse section. Fig. 4 is an elevation of a bushing serving as a bearing for the loose pulley. Fig. 5 is a horizontal section at x', Fig. 3. Fig. 6 is a detail horizontal section at x, Fig. 1, and a top view of the adjacent parts below. Fig. 7 is a detail horizontal section at y, Fig. 1, and a top view of the adjacent parts below. Fig. 8 is a central longitudinal section of the friction device.

A is the frame of the machine. a is the spindle or step-rail. b is the upper supporting-rail, and c is the ring-rail.

d is the spindle, stepped on the rail a, as hereinafter described, and provided with a fast pulley, e, and loose pulley f.

g is the main driving-shaft, which is to be rotated by a prime mover, and carries a grooved pulley, h, with a belt, i, that drives the spindle d.

g' is a shaft carrying a pulley, h', above the pulley h, the belt i being carried around the two pulleys h h' so as to extend in a nearly horizontal direction from between these two pulleys to the pulleys of the spindle.

k is the stop-motion rod, provided with pins k', extending above and below the belt i.

l is the feed-roller, attached by friction devices upon a shaft, l'. For such a friction device see Fig. 8, in which l represents the friction-roller mounted to revolve on the shaft l' between two collars, l'', which are adjustably secured upon said shaft by means of set-screws. The roller l is hollowed out at one end to receive a spring, l''', the action of which is to press the roller l along the shaft against the right-hand collar, l'', itself springing against the left-hand collar as a base. Thus the roller l is caused to revolve with the shaft l' by frictional contact with said collar at the right, and the amount of friction may be regulated by adjusting the collars farther apart or nearer together, and so fixing them on the shaft by means of the set-screws.

As shown in Fig. 3, the spindle d is supported by a step, a', in a bushing, m', which is driven firmly into a step-holder, b', that is fixed rigidly in the rail a. Above the rail a the step-holder b' is formed as an oil-receptacle, m.

The loose pulley f is formed with a sleeve, f', that extends downward into the oil-cup m, and around the spindle within the sleeve f' the bushing m' extends upward and forms a bearing for the loose pulley. The bore of the bushing upward from the step is made larger than the diameter of the spindle, to prevent the oil from rising when the spindle is revolving, as shown most clearly in Fig. 4. The bushing m' is slotted at opposite sides, so as to prevent the oil from rising too rapidly when the loose pulley is in motion, the edges of these longitudinal slots serving to scrape the oil off from the inner face of the pulley-sleeve and pass it to the bottom, and the bore of the loose pulley at its upper end is made smaller to prevent the oil that rises when it is in motion from escaping—that is to say, the upper end of the loose pulley is constructed with an inwardly-projecting flange for this purpose.

The sleeve f' of the loose pulley is provided with a collar, f^3, which prevents oil from rising on the outside of the flange and flowing over the oil-box.

In an aperture of the rail b is fixed a box, n,

through which the spindle extends, and around the spindle within the box n is a spiral spring, n', which at its ends takes snugly upon the bushing o on the spindle, and which is enlarged at its center to bear against the inner side of the box, so that the spring tends to retain the spindle in a central position, and at the same time this spring allows a limited side movement of the spindle, thereby insuring a more even running of the spindle with an unbalanced bobbin. The bushing o extends downward into an oil-cup, o', formed upon the upper side of the fixed pulley e, and, as shown, it is provided with grooves in its sides, which serve to convey the oil that is carried over the top of the bushing downward to the oil-cup o'. This carrying back to the foot of the spindle the oil which is constantly worked upward within the bearing and out at its top preserves the oil which would otherwise be soon thrown away and leave the bearing dry. Thus it insures the oiling of the bearing above the pulley.

At D is represented the board provided with pins for receiving bobbins of thread to be doubled and twisted. Upon the upper end of the stop-motion rod k is a frame, p, provided with a cross-pin, p', upon which are hung the fallers q. On this frame is pivoted an arm or lever, r, that extends at one side of the feed-roller l, for engaging with pins r' on the end of said roller. The inner or rear end of lever r is formed into two arms, p'', through which a cross-pin, s, extends at a little distance below the fallers q, while said fallers are supported on the threads.

When a thread breaks, it liberates a faller, which, falling upon the cross-pin s, operates the lever r to effect the stopping of the spindle, as hereinafter described.

The frame p is provided with an arm, s', to which horizontal rods t are attached, that serve to support the threads at each side of the points where the fallers q rest on them. The frame p is also provided with a guide-eye, t', and tension device u. This tension device consists of the wire which is coiled to form the eye t, extended toward the feed-roller l in a direction at an angle to the path of the doubled thread and bent near its end at a right angle.

Above the feed-roller is a smaller roller, u', which is carried by a standard, m^2, and is grooved, as shown most clearly in Fig. 2, and the feed-roller l is also formed with a groove, l^3, at one side. The stop-motion rod and the parts it carries is supported in its raised position by engagement with a fixed piece, v, upon the cross-rail v'.

At the lower end of the rod is fixed a spring-arm, w, which comes in contact with a flange, d', on the spindle or on the pulley e, limits the downward movement of the rod, and also serves as a brake to stop the rotation of the spindle.

Beneath the lower end of the rod is a gong, a^2, which is struck by the rod in its descent, and the arm w is made as a spring, so as to give a slight return movement to the rod after it strikes the gong, so as to clear the end of the rod from the gong. The lower end of the rod k is guided by a fixed piece, b^2, on the rail a, to which the gong is also attached.

Beneath the feed-roller l is a faller, d^2, pivoted on a pin, e^2, and provided with an eye at the outer end for receiving the double thread as it passes from the feed-roller to the traveler on the ring-rail c. This faller is provided with a tail portion, f^2, projecting beneath the lever r in front of the pivot p'. This faller is for the operation of the stop-motion in case the thread slackens or breaks in front of the feed-roller.

In operation the threads pass from the bobbins on the board D through hooks g^2, thence above the rods t, and through the eyes of their respective fallers, to and around the wire u, where the threads are doubled, and the tension adjusted by giving the united thread more or less turns around said wire u. The double thread then passes around the feed-roller l and over the small grooved roller u' a sufficient number of times to prevent any slip of the thread on the roller, the termination of the winding being in the groove l^3 of the feed-roller, and it then passes through the front faller, d^2, to the traveler. The grooved feed-roller serves to prevent the portion of the thread which is receiving the twist from being carried in contact with the other part of the thread where the twist has not commenced, and the grooved roller u' prevents the several laps of thread from running together.

The number of fallers q required for use can be regulated by having reserve fallers hanging below the pin s, and when more are required for use the pin can be withdrawn, the fallers raised above it, and the pin then returned to its place.

In case of the breakage of either thread, its faller being released, the inner end of the arm r is borne down and the outer end thrown upward, so as to be caught by one of the pins r' on the feed-roller, and the arm being thereby moved backward, the stop-rod k is released from its support v, and, falling, carries the belt i downward upon the loose pulley. At the same time the brake-arm w, bearing upon the flange d', stops the spindle instantly, and the lower end of the stop-rod, striking the gong a^2, gives the alarm. When the rod k falls, the arm or lever r comes in contact with a projection, h^2, on the standard supporting the roller u', and holds the tooth on the arm r in contact with the pin in the feed-roller. At the same time this projection h^2 serves as a fulcrum for the lever r in resetting the parts, as, by pressing down on the outer end of the lever, the stop-rod will be raised to its position and the spindle set in motion.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the fallers *q*, the support therefor, and the lever *r*, having the rear extending arm, *p''*, of the cross-pins, substantially as and for the purpose specified.

2. The combination, with the stop-motion rod *k*, the lever *r*, the feed-roller *l*, provided with pins *r'*, the shaft *l'*, the collars *l''*, and the spring *l'''*, of the standard m^2, having a projection, h^2, as shown and described.

3. The rod *k* and mechanism, substantially as described, for releasing the same when a thread breaks, in combination with the bell a^2, situated beneath said rod, the spring-arm *w*, secured to said rod, and a stop for spring *w*, substantially as described, whereby said rod when released will fall directly upon the bell and then be lifted therefrom, as specified.

4. The combination, with the rail *b*, box *n*, spindle *d*, the bushing *o*, provided with vertical oil-grooves, and the spring *n'*, of the pulley *e*, having an oil-cup, *o'*, into which the bushing extends, as shown and described.

5. The combination, with the spindle *d* and oil-receptacle *m*, of the loose pulley *f*, having the downwardly-extended sleeve *f'*, and at its upper end the inwardly-projecting flange, as shown and described, and for the purpose specified.

JOSEPH E. TYNAN.

Witnesses:
GEO. D. WALKER,
C. SEDGWICK.