

(No Model.)

T. FINIGAN.
FLIER FOR SPINNING JENNIES.

No. 539,473.

Patented May 21, 1895.

Fig 1:

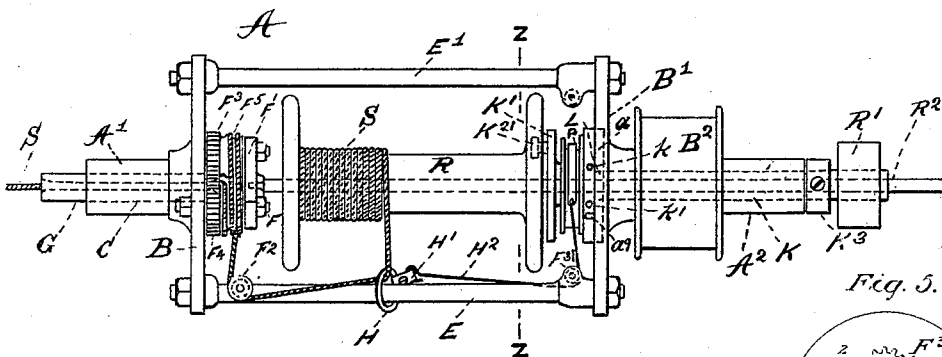


Fig 3:

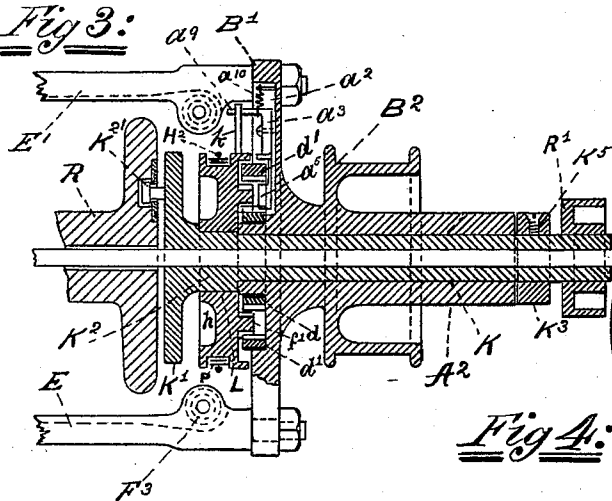


Fig 2:

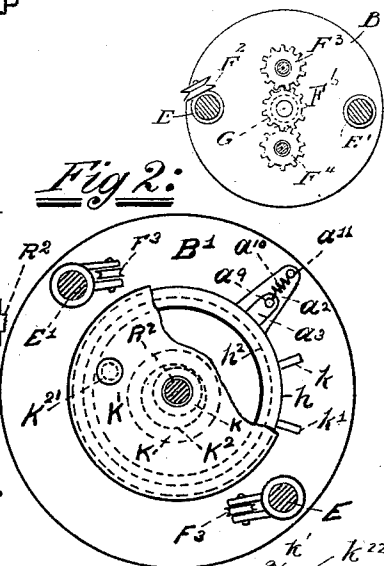
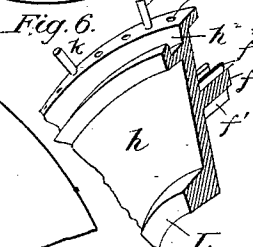
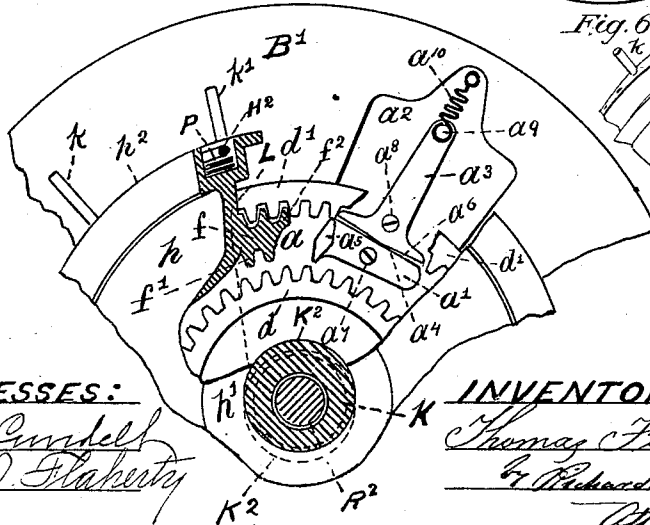


Fig 4:



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UNITED STATES PATENT OFFICE.

THOMAS FINIGAN, OF PATERSON, NEW JERSEY.

FLIER FOR SPINNING-JENNIES.

SPECIFICATION forming part of Letters Patent No. 539,473, dated May 21, 1895.

Application filed September 30, 1893. Serial No. 486,882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS FINIGAN, a citizen of the United States, and a resident of the city of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Fliers for Spinning-Jennies and other Textile Machines, of which the following is a specification.

The object of my invention more especially relates to the laying of yarn upon a bobbin, and facilitating the operation of doing the same, as well as laying a considerably greater quantity of material upon the bobbin, than has hitherto been done; also to make the flier arms shorter, so that a flier may be safely run at a higher speed than is usual, inasmuch as the arms connecting the heads being short, the torsional strain is to a great extent relieved, and the liability of the arms to burst by reason of the centrifugal force generated when in rapid motion, is avoided. Fliers of my newly invented construction may be incorporated in jennies as at present constructed, by simply substituting my flier for the usual flier and all its building and traverse mechanism necessary to efficiently perform the operation of winding the bobbin.

In the accompanying drawings, Figure 1 represents a side view of my newly-invented flier. Fig. 2 is a front view, partly broken, of one head and sectional on the line $z z$, Fig. 1. Fig. 3 is a part longitudinal section. Fig. 4 is a detail view illustrating the operating and reversing mechanism for the traverse-ring. Fig. 5 is a front view of one head, showing gear-operating capstans. Fig. 6 is a perspective view showing adjustment for stop-pins.

A represents a flier of my invention which is mounted in bearings formed in a jenny frame in the usual manner, and which rotates on the hollow trunnions A' , A^2 , which form part of the face plates B , B' . The hollow trunnion A' receives the hollow spindle G to conduct the yarn S , and the hollow trunnion A^2 receives the hollow tube K through which the spindle R^3 is passed.

The plates B , B' , are connected together by the arms E , E' , which are secured by nuts at their outer ends, the arms having suitable collars, formed on their ends, to allow of rigid and accurate adjustment.

Secured to the plate B by the studs F , and

plate F' , are the tension capstans F^5 , provided with the necessary driving gears F^3 , F^4 , and pinion F^6 , which forms part of the hollow tube G . On one end of the arm E , a guide F^2 , is secured on a suitable stud, and on the other end of the same arm is secured a similar guide F^{31} . A ring H travels loosely on the arm E , and to it a clip H' is attached for securing thereto the chain or cord H^2 . The plate B' has formed in its front face a recess a —a portion of which is extended outwardly, to receive and contain the reversing lever a' , and operating lever a^3 with its spring a^{10} .

Within the hollow trunnion A^2 is a hollow tube K which is provided at its outer extremity with a small faced driving plate K' , having a projecting button head pin K^{21} secured to its front face, and intended to engage a suitably formed slotted hole in the head of a winding bobbin R . A spindle R^2 passes through the tube K , and bobbin R , and rests at its outer end in a hole centrally formed in the plate F' .

The tube K at the back of the plate K' has an eccentric, or cam K^2 , formed on its outer surface the diameter of which corresponds with the hole in the hub L of the inside and outside geared ring f , of the plate h . The outer end of the tube K is provided with an adjustable locking collar K^3 . On the hollow trunnion A^2 , a driving pulley is secured by a key, or set screw, and a driving pulley R' is similarly secured to the tube K , at its outer end. In the recess a of the plate B' are located the external toothed ring d which has fifty nine teeth on its outer face, and the internal toothed ring d' which has sixty one teeth formed on its inner face, of about the same pitch. Located in the same recess a is a vibrating pawl, or tappet a' , which has a double knife edge projection a^5 , so formed as to lock the teeth of the ring d , when in one position, and the teeth of the ring d' , when in another position to the plate B' . The reversing tappet a' has a flat upper edge a^4 , to engage a curved face a^6 formed on the rocking, or operating lever a^3 , both tappet and lever being located upon suitable pivotal screws a^7 , a^8 , Fig. 4. A ring f which forms a part of the plate h is also partly inserted in the recess a , of the plate B' , and is provided with sixty external, and sixty internal teeth, f' , f^2 , of the same pitch as the teeth of the rings d , d' , with which

they may engage. The hub L of the face plate h is bored to suit the cam, or eccentric K^2 , which rotates therein freely.

The periphery of the plate h , has an annular groove h^2 formed therein, within which a coil tension spring P, is partly inclosed, one end of which is secured to the bottom of the groove h^2 by a rivet, and the other end by a suitable eye, is secured to the free end of the chain, or cord H^2 . On one end of the edges of the plate h , nearest the plate B' stop pins k' k may be adjustably located (as in Fig. 6), and which extend outwardly a sufficient distance to enable either one to strike the pin a^9 , on the reversing lever a^3 , as the plate h revolves to the right, or left. A spiral compression spring a^{10} gives a pressure to the lever arm a^3 , when thrown to either side of the center by the pins k k' .

I will now further explain the operation of my newly invented devices.

The bobbin R when empty being placed within the flier, the spindle R^2 is passed through the tube K, and hole in the bobbin R, resting in the cavity in the plate F' . The end of the yarn S is drawn through the tube G, and wound around the tension capstans F^5 , and thence partly around the guide F^2 , and along the flier arm E, to, and through the ring H, and then passed two or three times round the bobbin R, which is then locked to the pin K^{21} . Motion by belt is then given to the flier pulley B^2 which revolves the flier at any desired speed. Motion is also given by a suitable belt to the capstans F^5 through the gear F^3 , F^4 , F^6 , in the same manner as in general use. Motion is also imparted to the bobbin R, by the stud pin K^{21} , face plate K' , tube K, and pulley R' , which is driven in the usual manner by a suitable belt. The speed of the flier A is so arranged, that it shall exceed the speed of the bobbin R, so that tension may be given, sufficient to lay the yarn S upon the surface of the bobbin R. The faster motion by the flier A in covering the bobbin R, causes the belt to slip on the pulley R' and imparts the necessary amount of friction to hold the yarn S in tension, in the same manner as in jennies in present use. The difference of revolution between the flier and bobbin, or that used for covering the bobbin R with one turn of yarn, I utilize by my device to regulate the traverse, or laying motion in the following manner: The pins k , k' secured in the holes k^{22} on the plate h , are located a suitable distance apart so as to strike the pin a^9 of the reversing tappet a^3 , according to the length of the bobbin to be covered. The plate B' being locked to the ring d' by the double pawl A^5 pivotally secured to the plate B' engaging in one of its teeth, the ring d' is caused to revolve with it, the external toothed ring d being disengaged and running idle. The plate h by its hub L with its internal and external teeth f' , f^2 is lifted by the cam K^2 of the tube K, which by its plate K' and pin K^{21} is locked to the bobbin to be

covered, into alternate engagement with the rings d , d' ; the teeth f' with teeth on the ring d and the teeth f^2 with teeth on the ring d' . In thus engaging and disengaging during a revolution of the tube K the ring h is moved around the cam a distance equal to one tooth by reason of the difference in number of teeth in the rings d , d' , those on the plate h being equal. The advance of the plate one tooth winds the chain or cord H^2 located in groove h^2 and secured by spring P in the same upon the plate h and by the guide F^8 , clip H' , and ring H, draws the yarn S along the arm E of the flier A the distance equal to one tooth or the diameter of the yarn to be laid. The tension on the spring P, and chain or cord H^2 , is given by the strain on the yarn S through its delivery from the capstans, the same being regulated in the usual manner. This laying or building movement continues regularly until the whole length of the bobbin is covered and the pin k' has approached and touched the pin a^9 , on the reversing lever a^3 , which is thrown slightly out of the center line. The spring a^{10} then exerts a force and completes the travel of the lever a^3 with a snap. The lower face a^6 of the lever a^3 then coming in contact with a corresponding upper edge a^4 of the rocking lever a' , the knife edged pawl a^5 is withdrawn from engagement with the teeth of the ring d' , and inserted into and locks the teeth of the ring d . The plate h with its ring f and hub L rotating on the cam or eccentric K^2 formed on the tube K, then begins to move in the opposite direction letting out tooth by tooth, or lay by lay, the chain or cord H^2 which has been wound on the groove h^2 of the plate h , by the previous movement, and permits the ring H to be drawn along the arm E by the tension of the yarn S, until the bobbin R is again covered with another layer of yarn, and the pin k again strikes the reversing pin a^9 , and so on alternately until the bobbin is completely filled, when it is removed and replaced by another bobbin. It may be seen that the motion forward is gained by the difference in number in the teeth of the ring d' and those on the plate h , and the return movement by those on the ring d and those of the plate h . I may mention as an illustration to more fully describe this motion, that three annular rings of different diameters one of which located within the space formed by the outer diameter of the smaller, and the inner diameter of the larger, when placed in a vertical position, and rolled along a flat plane the inner and outer circumferences of the rings at the termination of one revolution will have traveled a varying distance, although each ring will have made a complete revolution. Should the point of contact be with the middle ring and the smallest ring the motion will be in one direction, and if with the middle ring and the largest, the motion will be in another direction the surfaces gained or lost in the operation representing the teeth I gain or lose and

use to operate the traverse ring H of my newly invented flier.

What I claim, and desire to secure by Letters Patent, is as follows:

5 1. In a flier for a spinning jenny the combination of the flier heads and arms connecting the same, one of said heads being provided with a recess in its face, a tube K extending axially through said head and means
10 for rotating the same, a cam on said tube, a plate *h* provided with the external and internal gearing and loosely mounted on said cam, the internal and external toothed rings loosely
15 mounted in the recess of said head, a locking device attached to said head and adapted to engage and lock either of said last named rings, stop pins mounted on the plate *h* and adapted to operate the locking device, a traveler on the flier arm, and a cord connecting
20 said traveler and the plate *h* substantially as specified.

2. In a jenny flier the combination of the heads B, B' the latter provided with a recess in

its face, hollow trunnions A' A², arms E, E' connecting the heads B B', pulley B² attached to
25 said heads, the driving tube K having thereon the pulley R² and cam K², a cam plate *h* having thereon a peripheral groove provided with an internally and externally toothed ring mounted
30 on said cam, the internally and externally toothed rings *d d'* mounted in said recess, a pawl *a'* with double engaging teeth adapted to lock either the internally or externally
toothed ring to the flier head, an operating lever *a³* for said pawl having a striking pin
35 *a⁹* and spring *a¹⁰*, adjustable striking pins *k, k'* mounted on the plate *h*, a spring P and cord H² secured in said peripheral groove of plate *h*, and a traverse ring mounted on the
40 flier and connected to said cord substantially as and for the purposes specified.

THOMAS FINIGAN.

Witnesses:

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MATHEW J. FLAHERTY.