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Patented June 11, 1901.

J. E. TYNAN.

BELT DRIVEN TWISTING MACHINE.

(Application filed Oct. 30, 1900.)

(No Model.)

Fig. 1.

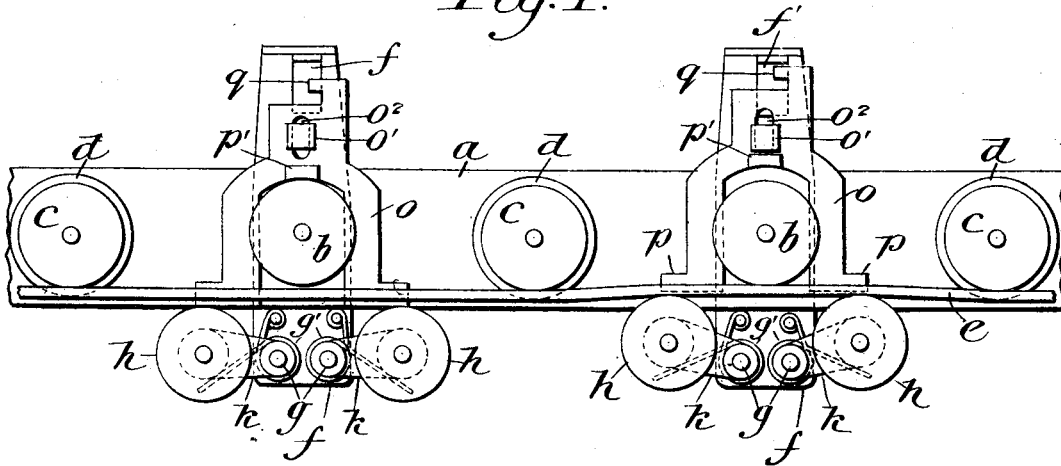
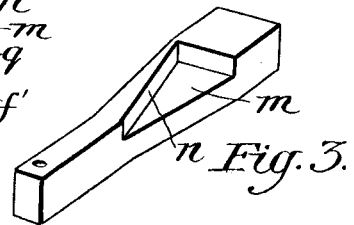
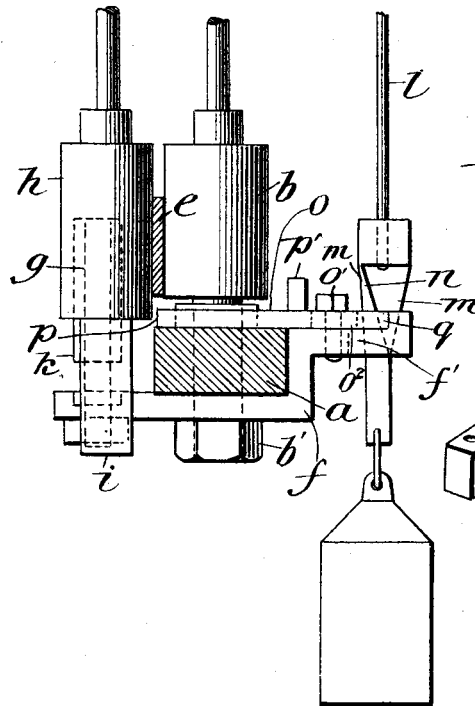


Fig. 2.



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BELT-DRIVEN TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,057, dated June 11, 1901.

Application filed October 30, 1900. Serial No. 34,971. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. TYNAN, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Belt - Driven Twisting-Machines, of which the following is a specification.

My invention relates to that class of twisting-machines in which the pressure of a moving belt which passes by and presses against each spindle on the spindle-rail causes all of such spindles to revolve.

The object of my invention is to apply such a method of driving to spindles on which threads are to be laid by means of rings and travelers, and to apply it in a manner that will admit of the ready stoppage of any spindle, and also to apply such method of driving and stopping to successive groups of three spindles each, two of which spindles, containing the threads to be twisted, are to be driven in one direction, while the third spindle, which is the ring or twisting spindle and which receives the finished thread, is to be driven in the opposite direction, and I provide means whereby an individual ring-spindle which is stopped shall be protected from interference through the operation of adjoining ring-spindles.

In the drawings, Figure 1 is a plan view of my device, and Fig. 2 is an end elevation of the same.

Throughout the drawings similar letters indicate similar parts.

The spindle-rail of the machine is shown at *a*. Upon it are mounted the spindles *b*, the supports of which are secured to the rail by nuts, as at *b'*. Mounted upon the spindle-rail are also guard-pulleys *c*, having the flanges *d*, which act as supports for the driving-belt, which is shown at *e*. The pulleys *c* maintain the running-line of the driving-belt, said running-line being such that the belt will entirely escape touching the spindles *b*. One of these guard-pulleys *c* is mounted between each two spindles *b*, which relation of the parts of course results in each spindle *b* being between two of the guard-pulleys. At *f* is shown a bracket secured to the spindle-rail by the same nut *b'* which secures the spindle-support thereto. This bracket ex-

tends forward beyond the line of the spindle-rail and has secured therein two studs *g*, upon each of which a spindle *h*, mounted in its support *i*, swings by means of a wing *k*, extending from the spindle-support and hinged upon the stud *g*.

In the making of organzine-silk thread the spindles are formed in groups of three, and each group is independent of the other groups. This is the form of application of my present device that I show in the drawings. The threads spun upon the two outer spindles are doubled together by means of mechanism fully explained in former patents granted to me and then twisted and wound upon the rear spindle by means of a ring and traveler. A full description of the parts not here shown, an examination of which will make more clear the application of the present device, is set forth in a patent for machines for throwing silk granted to me February 19, 1889, and numbered 398,359.

Each spindle *h* of a group swings, by means of the wing *k*, upon its support on the opposite side of the spindle *b* from its fellow, and each spindle *h* is forced against the driving-belt by means of a spring *g'*. As a result one of the spindles *h* presses against the driving-belt on each side of the spindle *b* and the driving-belt is bent from the line which the pulleys *c* otherwise cause it to form and is forced against the spindle *b*. The belt as it travels then drives the two spindles *h* and the spindle *b*, the spindles *h* both revolving in one direction and the spindle *b* revolving in the opposite direction.

A rod *l* extends downward from the feeding mechanism of the machine to connect the stop-motion of the feeding mechanism with the stop-motion of the driving device, which I am about to describe. I do not show the upper part of this rod *l* nor the feeding mechanism with which it is connected, as such parts are fully set forth and described in my former patent above referred to. Suffice it to say that when the stop-motion of the feeding mechanism of the machine is operated by the breakage of a thread or other cause the rod *l* falls to operate the stop-motion of the driving mechanism and causes the revolving of the spindles to cease. In the present instance the mechanism which I employ to stop

the spindles when the rod *l* falls is as follows: The bracket *f* has at its rear end a slot *f'*, the rear part of which forms an inclined plane. A plate *o* rests partly upon the spindle-rail and partly upon the bracket *f* and is held to the bracket *f* by means of the set-screw *o'*, there being space enough, however, between the head of the set-screw *o'* and the plate *o* to allow the plate to slide, and a slot *o''* is provided in the plate *o*, in which slot the set-screw *o'* is secured, so that the plate *o* can slide backward and forward. This plate *o*, resting upon the spindle-rail, extends on both sides of the support of the spindle *b* and has at its forward end two striking-pieces *p*, one of which when the parts are running is in close proximity to each of the spindles *h*. Upon the plate *o* is a brake *p'*, the purpose of which will presently be explained. Secured to the lower end of the rod *l* is a wedge *m*, which extends through the slot *f'* in the bracket *f* and which has at its lower end a weight, whereby the rod *l* and the wedge when they fall descend with considerable force. In descending, the wedge *m*, sliding in the slot *f'*, forces the plate *o* forward. Each striking-piece *p* comes in contact with and presses forward its respective spindle *h*, swinging on its stud. The pressure of the spindles *h* is removed from the driving-belt *e*, which assumes its natural running-line clear of the spindle *b*, and the spindles *h* are moved out to a point where the driving-belt at its natural running-line does not touch them. The spindles are then all clear of the driving-belt and are free to cease to revolve. I prefer to have the striking-pieces *p* strike the revolving part of their respective spindles *h*, as they act as brakes to cause the spindles to stop quickly. To effect the same object upon the spindle *b*, the brake *p'* upon the plate *o* is pressed against the whirl of the spindle *b* by the forward movement of the plate *o* to stop the momentum of the spindle. The wedge *m* has upon it a further wedge *n*, which comes into use when the parts are to be started. The plate *o* is provided at its inner end with a projection *q*, which extends behind the wedge *n*. When the parts are stopping, the descending of the wedge *m* and the wedge *n* prevents the wedge *n* from interfering with the forward movement of the plate *o*; but when the rod *l* is raised to start the parts, as fully explained in the former patent to me above referred to, the wedge *n* acts upon the part *q* of the plate *o* and draws the plate *o* backward out of contact with the spindles.

In the use of a ring-and-traveler device for laying thread upon a bobbin it is essential that the ring-spindle, which in the present instance is the spindle *b*, should be a fixture on the spindle-rail. This fact makes it impossible to get an operative device for removing the pressure of the driving-belt from the ring-spindle by moving the spindle out of contact with the driving-belt, as the sides of the ring on the ring-rail would injure the

thread on the bobbin by rubbing against it; also, the bottom head of the bobbin would strike the ring. In my invention the ring-spindle maintains a position central with the ring, and the natural running-line of the belt is entirely clear of the ring-spindle, so that the driving-belt will return to its natural line away from the ring-spindle as soon as the pressure of the spindles *h* is removed from it.

I am aware that in machines of this general class attempts have been made to apply a stop-motion to the ring-spindle by having a pulley or pulleys, either acting as spinning-spindles or merely as pressure-pulleys, to press the driving-belt against the ring-spindle and providing means to remove the pressure of such pulley or pulleys from such driving-belt when it was desired to stop the spindle; but in such cases when the pressure pulley or pulleys are removed from pressing against the driving-belt such driving-belt is nevertheless kept in contact with the ring-spindle it is desired to stop by virtue of the pressure of the pressure-pulleys operating on the ring-spindles to the right and left of said ring-spindle. Consequently if a ring-spindle it is intended to stop can be stopped at all by such a device it can only be by the application of a brake to the spindle strong enough to cause it to cease to revolve and to hold it from revolving in spite of the fact that the driving-belt is still rubbing against it. If the spindle is stopped in this way, it will soon grow hot from the rubbing of the belt and will also destroy the belt. In my invention when the pressure of the spindles *h*, which act as pressure-pulleys, is removed the driving-belt between the two guard-pulleys adjacent to said ring-spindle returns to its natural running-line maintained by said guard-pulleys, and said guard-pulleys act as protectors to prevent said driving-belt from being pressed against said ring-spindle by the mechanism employed to press the belt against the ring-spindles to the right and left of said spindle. While I mount my guard-pulleys *c* in such a position as to cause the driving-belt when a ring-spindle is stopped to run entirely clear of such ring-spindle, yet it is obvious that even if the surface of the whirl of the ring-spindle were in line with the surface of the guard-pulleys said guard-pulleys would, though in a lesser degree, still be a protection.

In the drawings, in Fig. 1, two groups of three spindles each are shown. In one group the belt *e* is pressed out of its natural line by the spindles *h* and against the spindle *b*, so that all three spindles will be driven by the travel of the belt. In the other group the stop-motion has acted, the spindles *h* are held from contact with the driving-belt, and the belt is in the line maintained by the surfaces of the guard-pulleys *c*, running clear of the spindle *b*, and prevented by the guard-pulleys *c* from being pressed against said spindle *b* by the operation of adjoining groups.

While it is my intention to use the device herein described principally for the making of organzine-silk thread, in which use each of the spindles *h* and the spindle *b* will all be
 5 used in spinning or twisting the threads, yet it is obvious that the mechanism is readily adaptable to a belt-driven twisting-machine in which none but the spindle *b* would be used for twisting the threads. In this case one
 10 spindle *h* would be dispensed with, and the remaining spindle *h* would be simply a pressure-pulley to press the driving-belt out of its natural running-line and against the twisting-spindle *b*.

15 What I claim as my invention, and desire to secure by Letters Patent, is—

1. A spindle-rail, a twisting-spindle mounted thereon, a driving-belt having its natural running-line out of contact with said twisting-spindle, and means for driving said belt,
 20 in combination with guard-pulleys for said twisting-spindle, and a pressure-pulley to press said driving-belt out of its natural running-line and into contact with said twisting-spindle, substantially as and for the purpose
 25 described.

2. A spindle-rail, a twisting-spindle mounted thereon, a driving-belt having its natural running-line out of contact with said twisting-spindle, and means for driving said belt,
 30 in combination with guard-pulleys for said twisting-spindle, a pressure-pulley to press said driving-belt out of its natural running-line and into contact with said twisting-spindle, and means, brought into operation when
 35 the parts are to be stopped, to cause said pressure-pulley to cease to press the driving-belt against the twisting-spindle, substantially as and for the purpose described.

3. A spindle-rail, a twisting-spindle mounted thereon, a driving-belt having its natural running-line out of contact with said twisting-spindle, means for driving said belt, guard-pulleys for the twisting-spindle, and two
 45 spindles so mounted as to press said driving-belt out of its natural running-line and into contact with said twisting-spindle, in combination with means, brought into operation when the parts are to be stopped, to move the
 50 two spindles pressing against the driving-belt from contact with said driving-belt, substantially as and for the purpose described.

4. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, and means for driving the same, a spindle *h*, on the opposite side of the driving-belt from the spindle *b*, and so mounted
 55 as to be able to exert a pressure upon the driving-belt *e*, in combination with the guard-pulleys *c*, substantially as and for the purpose described.

5. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, and means for driving the same, the spindles *h*, on the opposite side of the driving-belt from the spindle *b*, and so
 65 mounted as to be able to exert a pressure upon the driving-belt *e*, and the guard-pulleys *c*, so placed as to prevent the pressure

of the spindles *h* upon the driving-belt from pressing said belt against adjoining twisting-spindles, in combination with means, brought
 70 into operation when the parts are to be stopped, to move the spindles *h*, substantially as and for the purpose described.

6. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, means for driving the belt, the
 75 guard-pulleys *c*, and the pressure pulleys or spindles *h*, so mounted as to exert a pressure against the driving-belt *e*, in combination with the plate *o*, a striking-piece, *p*, the rod *l*, and the wedge *m*, substantially as and for
 80 the purpose described.

7. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, means for driving the belt, the guard-pulleys *c*, and the pressure pulleys or
 85 spindles *h*, so mounted as to exert a pressure against the driving-belt *e*, in combination with the plate *o*, having the part *q*, the rod *l* and the wedge *n*, substantially as and for the purpose described.

8. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, means for driving the belt, the guard-pulleys *c*, and the pressure pulleys or
 90 spindles *h*, so mounted as to exert a pressure against the driving-belt *e*, in combination with the plate *o*, carrying the brake *p'*, a striking-piece *p*, the rod *l* and the wedge *m*, substantially as and for the purpose described.

9. The spindle-rail *a*, the spindle *b*, the driving-belt *e*, means for driving the belt, the
 100 pressure pulleys or spindles *h*, the guard-pulleys *c*, the bracket *f*, secured to the spindle-rail, and having the slot *f'*, and a stud *g*, in combination with the rod *l*, the wedge *m*, the plate *o*, the striking-piece *p*, the support *i*
 105 and the wing *k* upon said support, said wing *k* being hinged upon the stud *g*, substantially as and for the purpose described.

10. A spindle-rail, a twisting-spindle mounted thereon, a driving-belt to drive said twisting-spindle in common with other twisting-spindles upon the same spindle-rail, means
 110 for driving said belt, guard-pulleys on the same side of said driving-belt as said twisting-spindle, and a pressure-pulley on the side of the driving-belt opposite said twisting-spindle, in combination with means, brought
 115 into operation when the twisting-spindle is to be stopped, to cause the pressure-pulley to cease to press the driving-belt against said twisting-spindle, substantially as and for the
 120 purpose described.

11. A spindle-rail, a row of twisting-spindles mounted thereon, a driving-belt to drive all of said twisting-spindles in common, means
 125 for driving the belt, and means, separately provided for each twisting-spindle, to press the driving-belt against such twisting-spindle, in combination with means for removing the pressure from that part of the driving-belt adjacent to any individual twisting-spindle when such twisting-spindle is to be
 130 stopped, and a series of guard-pulleys, on the same side of the driving-belt as the twisting-

spindles, said guard-pulleys being so distributed that each twisting-spindle is between two of such guard-pulleys, and the relation of each two guard-pulleys to the twisting-
5 spindle between them being such as to protect such twisting-spindle, when stopped, from interference from the means employed to press the driving-belt against the adjoin-

ing twisting-spindles, substantially as and for the purpose described.

Signed by me this 8th day of October, 1900. 10

JOSEPH E. TYNAN.

Witnesses:

JAMES D. DONNELL,
CHARLES S. HUMPHREYS.