No. 755,261. PATENTED MAR. 22, 1904.

J. E. TYNAN.

BELT DRIVEN TWISTING MACHINE.

APPLICATION FILED FEB. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

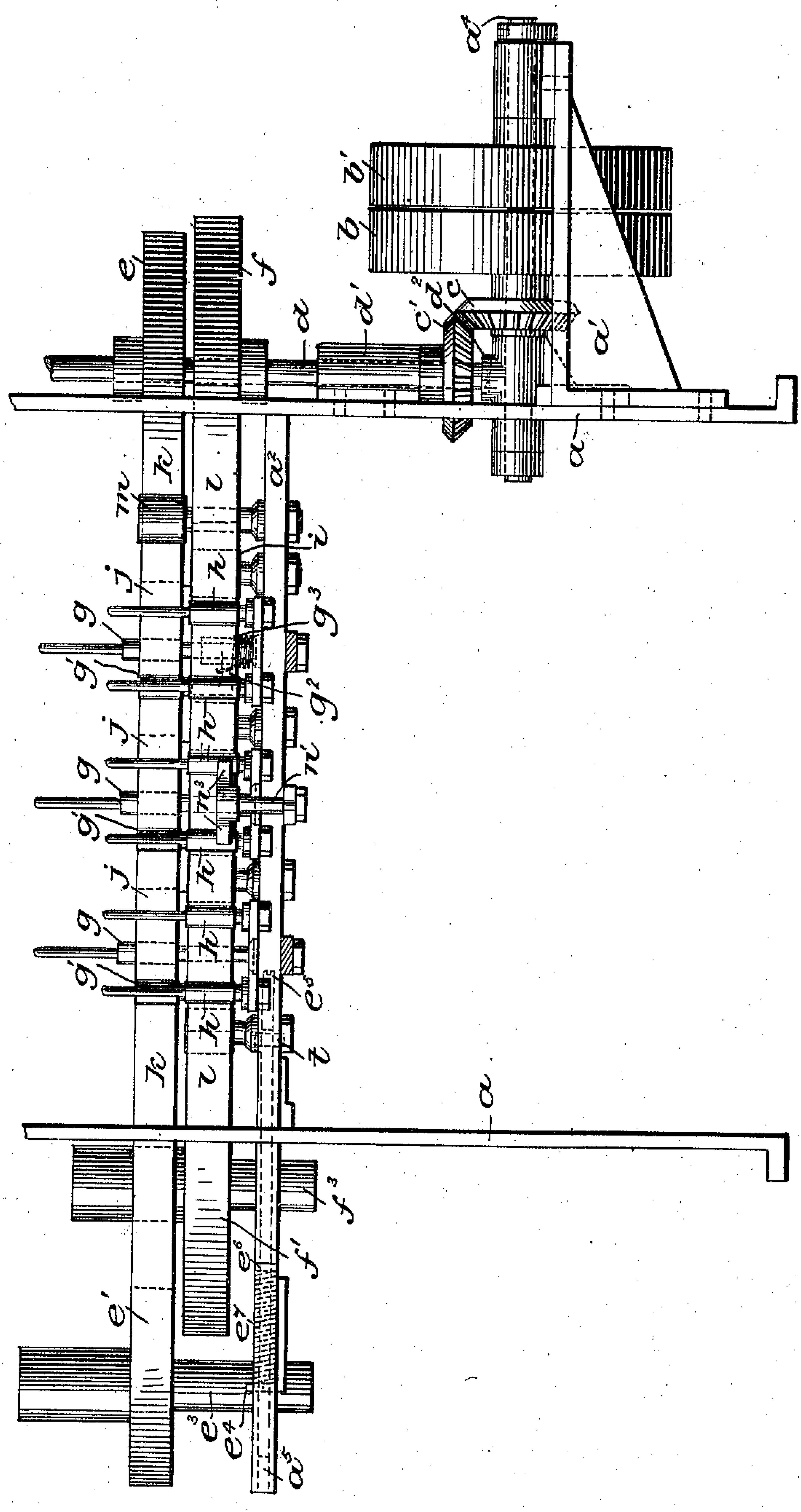


Fig. 1.

Witnesses:
Ralph Turner
John C. Leazer

Inventor:
Joseph E. Tynan
by
Leonard J. Tynan, atty.

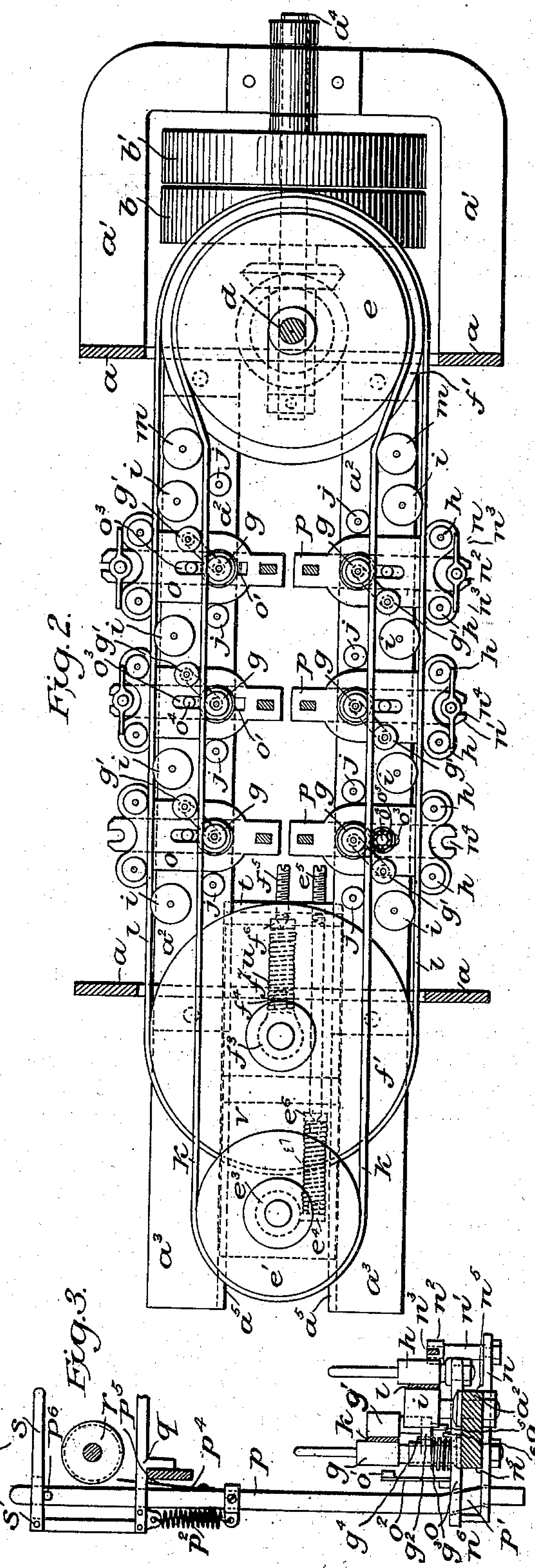
No. 755,261. PATENTED MAR. 22, 1904.

J. E. TYNAN.

BELT DRIVEN TWISTING MACHINE.

APPLICATION FILED FEB. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 2.



Witnesses:

Ralph Turner

John C. Leazer

Inventor:

Joseph E. Tynan

by

Leonard J. Tynan, atty.

No. 755,261. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

BELT-DRIVEN TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 755,261, dated March 22, 1904.

Application filed February 25, 1903. Serial No. 145,109. (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 spindles are arranged in groups and the threads drawn from bobbins on certain spindles of a group are twisted and doubled and after being doubled are again twisted and laid upon a bobbin on another spindle of the group.

The object of my invention is to provide a way of driving the spindles of the successive groups by belts and of stopping each group of spindles when desirable independently of the other groups of spindles driven by the same belts.

My present invention is an improvement on a device shown in a former patent granted to me, numbered 676,057 and dated June 11, 1901, for belt-driven twisting-machines.

In the drawings, Figure 1 is a front elevation, and Fig. 2 is a plan view, of an abbreviated machine containing my device. Fig. 3 is an end elevation of an individual group of spindles and their connecting parts.

Throughout the drawings similar letters indicate similar parts.

The frame of the machine is shown at a. The spindle-rail is lettered a^2. A bracket a', secured at one end of the machine, carries the outer bearing for the shaft a^4, upon which the fast and loose pulleys b and b', respectively, revolve. The shaft a^4 has its inner bearing mounted on the frame a. A perpendicular shaft d rests at d^2 and has a support d' secured to the frame and a further support (not shown) at its upper end. Upon the horizontal shaft a^4 is the bevel-gear c. Upon the vertical shaft d is the bevel-gear c'. Upon the shaft d are secured two pulleys e and f. At the other end of the machine are carrier-pulleys e' and f' to correspond to the pulleys e and f. A belt k passes around the pulley e and runs to and drives the pulley e'. Another belt, l, passes around the pulley f and runs to and drives the pulley f'. The revolving of the shaft a^4 by means of the pulley b will, through the medium of the bevel-gears c and c', impart motion to the vertical shaft d, cause the pulleys e and f to revolve, and the belts k and l to travel. The pulleys e' and f' have movable bearings in order that the respective belts may be tightened, as will be hereinafter explained.

Pulleys m m, one on each side of the machine, cause the belt k to travel parallel with the machine and the going and returning parts of the belt to run parallel with each other without regard to the fact that the diameter of the pulley e is greater than the distance between the going and returning parts of the belt k. As the parts are shown in my drawings the distance between the pulleys m m equals, except as to the thickness of the belt, the diameter of the carrier-pulley e'. The belt l runs parallel with the machine, and the going and returning parts of the belt run parallel with each other, owing to the pulleys f and f' being of the same diameter.

At g are shown twisting-spindles the pillars or supports of which are secured to the rail a^2.

At g' are pressure-pulleys, mounted in brackets g^2, which brackets are mounted on and turn on the pillars that support the spindles g. A spring g^3, coiled about the sleeve of the bracket g^2, has its lower end secured at the base of the pillar of the spindle g, while its end g^4 presses against the bracket g^2 and tends to turn the same upon the pillar of the spindle g. The effect of the action of the spring g^3 is that the pressure-pulley g' is pressed against the belt k and presses said belt against the whirl of the spindle g, so that the travel of the belt will cause the spindle g to revolve. At j are guard-pulleys mounted on the rail a^2. These guard-pulleys limit the action of each pressure-pulley g' to the spindle to which it relates.

Pulleys i, mounted on the rail a^2, maintain the running-line of the belt l.

A plate o loosely encircles the pillar of each spindle g, the hole in the plate being so large that the plate can be moved a limited distance without being confined by the pillar. An extension of the hole in the plate o forms a slot o^3, through which a stud o^4 projects, the lower end of the stud being secured to the spindle-rail. Upon the stud o^4, as shown on one plate o in Fig. 2, are a washer, a spring, and a nut o^5 to hold the plate o down to the rail a^2, at the same time allowing the plate to be loose enough to slide readily in and out upon the rail, guided by the stud o^4 in the slot o^3.

Upon the front of the plate o are secured the supports of two spindles h h. When the plate o is moved inward, these spindles bear against the belt l and are driven by it. When the plate o is moved outward, the whirls of the spindles h h are clear of the belt l.

Mounted on the back of the plate o and behind the whirl of the spindle g is a spring o^2, carrying at its upper end a brake-shoe o'.

At o^6 is an upward projection on the plate o.

At g^5 is a downward projection from the bracket g^2. If the plate o is pushed forward, the part o^6 will impinge against and thrust forward the part g^5 and the pressure-pulley g' will be moved so that it will cease to press the belt k against the spindle g. At the same time the brake-shoe o', moving forward with the plate o, impinges against the whirl of the spindle g and overcomes the momentum of the spindle.

A plate n is secured beneath the rail a^2. For convenience I fasten it to the rail by the same nut that secures the pillar of the spindle g. The plate has lips n^5, that grip the rail a^2 and hold the plate steady. At the forward end of the plate n is a jaw n^4. A stud n' is adjustably secured by a nut in this jaw n^4. A brake n^2, having the brake-fingers n^3, rests on a shoulder on the upper part of the stud n'. The brake is free to turn upon the stud. The brake-fingers n^3 are contiguous to the spindles h h. When the plate o is moved forward, the spindles h h, mounted thereon, are carried with it, and so out of contact with the belt l, and the whirls of the spindles are forced into contact with the respective brake-fingers n^3 of the brake n^2, thus overcoming the momentum of the spindles h h.

If the brake-shoe o' for the spindle g were rigid, a great nicety of fitting would be required to have the two brake-fingers n^3 brake the spindles h h and the brake-shoe o' brake the spindle g at the same time, in view of the fact that both brakes are brought into action by the movement of the plate o. It is for this reason that the brake-shoe o' is mounted on the spring o^2. The adjustment of the parts is such that the brake-shoe o' touches its spindle g before the respective spindles h touch their brake-fingers n^3. The spring o^2 then bends as the plate o is pressed forward until the whirls of the spindles h touch their respective brake-fingers n^3.

The fact that the brake n^2 is free to turn upon the stud n' also makes less nicety of fitting necessary, as if one brake-finger n^3 comes into contact with its spindle before the other brake-finger n^3 the brake n^2 can turn slightly and allow the parts to adjust themselves.

The outward movement of the plate o, to which I have referred in the foregoing description, is brought about through the action of the rod p. The vertical lower end of this rod passes through a slot in the fixed plate n. A wedge p' upon the rod passes through a slot in the sliding plate o. Upon the rod p is a spring p^2, one end of which is secured to a bracket q and the other end of which is secured to a collar on the rod p. The bracket q is the usual bracket employed to hold fallers for the threads or a faller-lever. This bracket is secured to a rail of the machine.

At r is shown a slotted roller for actuating fallers or a faller-lever. These parts have been shown without detail because they do not relate to the present invention.

At p^4 is a latch-spring secured to the rod p. At the upper end of the latch-spring is the latch p^5. The bracket q has a slot through which the rod p passes. The latch-spring p^4 also passes through this slot. The latch p^5 impinges against the bottom of the bracket q. A starting-lever s is pivoted at s' and has as a fulcrum the pin p^6 in the rod p. It will be noticed that the upper part of the rod p is prevented by an abutment in the bracket q from being moved inward, while the latch-spring p^4 prevents the rod from being moved outward. It will also be noticed that the vertical lower part of the rod p, passing through a slot in the fixed plate n, is controlled by said slot, so that it cannot be moved inward or outward therein. The result is that the rod p, though it may be moved up and down, maintains its upright position under all circumstances. The wedge p', passing through the plate o, acts to move the plate either outward or inward as the rod is moved up or down, the front part of the wedge acting to move the plate outward and the rear part of the wedge acting to move it inward. When the parts are running, the wedge is between the fixed plate n and the movable plate o, the upper part of the wedge extending through the plate o. When the rod p moves upward and the wedge p' forces the plate o outward, the force of the movement of the plate is exerted against the rear of the slot in the plate n. When the rod is lowered and the wedge moves the plate inward, the force of the movement of the plate is exerted against the front of the slot in the plate n. The fact that the plate n is secured beneath the rail a^2, while the plate o slides on the rail a^2, furnishes the necessary space between the two plates for the wedge p' to have sufficient of its incline below the plate o to be ready to perform its work when the rod p is moved upward. At n^6 is an upward extension of the plate n, which supports the rear of the movable plate o.

When through any cause the stop-motion of the machine is brought into action, the upper part of the latch-spring p^4 will be pushed inward, the latch p^5 will be moved away from its bearing on the bracket q, the spring p^2 will force the rod p upward, the fulcrum p^6 will throw the forward end of the starting-lever s upward, the wedge p' on the rod p will force the plate o outward, and the outward action of the plate o will move the two spindles h h from contact with the belt l and against their respective brake-fingers n^3. The outward movement of the plate o will also cause the part o^6 to impinge against the part g^5 and move the pressure-pulley g' so that it will cease to press the belt k against the spindle g. At the same time the outward movement of the plate will bring the brake-shoe o' into contact with the whirl of the spindle g and stop the momentum of the spindle. All the three spindles comprising a group will then have ceased to revolve. When the lever s is thrown upward, it can be seen at a considerable distance and acts as a signal to the operator that the parts are stopped.

In Fig. 2 of the drawings the central group on each side of the machine is shown with the spindles and their driving means separated and the spindles stopped, while the groups to the right and left of the stopped groups are shown running.

The machine will of course be provided with feed-rollers and with connections between them and the rod p to cause the upward movement of the rod p to move the feed-rollers from contact with their driving-roller and stop the feeding of the threads at the same time that the spindles cease to revolve; but as such parts form no part of my present invention I have not shown them in the drawings.

When the threads have been repaired and the group of spindles is to be started, the operator presses down the outer end of the lever s, and said lever, hinged at s', presses upon the pin p^6 and forces the rod p downward against the pull of the spring p^2 until the latch-spring p^4 throws the latch p^5 under the bracket q. The downward movement of the rod p causes the wedge p' to slide the plate o inward, thus bringing the two spindles h into contact with the belt l and allowing the spring g^3 to force the pressure-pulley g' against the belt k and cause the belt k to press against and drive the spindle g. The downward movement of the rod p of course allows the feeding mechanism for the threads to resume operation at the same time that the spindles are again revolved.

It will be observed that the two belts k and l, both driven from pulleys on the upright shaft d, naturally both travel in the same direction. In order, therefore, to get the belts to drive the respective spindles to which they relate in opposite directions, as is requisite for the purposes of this machine, the inner side of the belt k drives the spindles g and the outer side of the belt l drives the spindles h. The effect upon the direction of revolution of the spindles is then the same as if a group of three spindles were driven by the opposite sides of a single belt, as is the case in the former patent granted to me for belt-driven twisting-machines, dated June 11, 1901, and above referred to. The action of the guard-pulleys j and the pressure-pulleys g' is similar to the action of like devices shown in said former patent. The advantages of the present device over that shown in my former patent are that the spindles g and h h can be farther apart than when both have to gain their motion from one belt and that the relative speeds of the spindles g and h can be varied by changing the size of the pulley e. The greater distance between the spindles has advantages in the mechanical construction of the parts and in the operation of the machine. The possibility of changing the relative speeds of the spindles by changing the size of the pulley e meets the wants of those who from time to time and to suit various kinds of fabric vary the proportion of the twist given to the threads, so that the doubled thread laid upon the bobbin on the spindle g will have a greater or less twist in proportion to the twist in the threads drawn from the bobbins on the spindles h h. It will be observed that the position of the two pulleys m m allows of a considerable variation in the size of the pulley e without in any way affecting the running-line of the belt k.

In the drawings I have placed the designating-letters g and h on the whirls of the respective spindles, intending thereby to designate the spindles as entireties, as the whirl of each spindle is an integral part thereof.

I will now describe the carrier-pulleys e' and f' and the belt-tightening appliances connected therewith. The rails a^2 are extended at one end of the machine beyond the frame a. I have lettered this extended part a^3. The inner edge of the part a^3 of the rail is channeled, as shown at a^5. This channeling extends to a point beyond the frame a and includes part of the rail proper, a^2. A block t is placed in the channels of the respective rails, which face each other. A plate u is next placed in the two channels. This plate carries the pillar f^3, which supports the pulley f'. A second plate v is then placed in the two channels. This plate carries the pillar e^3, which supports the pulley e'. The pillar e^3 has a projecting part e^4. A screw e^5 passes through and is threaded in the block t and extends to and bears upon a block e^6, that is connected by the spring e^7 with the projecting part e^4. The pressure of the spring e^7 upon the projection e^4 of the pillar e^3 tends to slide the plate v in its channels and by thus increasing the distance between the pulleys e and e' keeps the belt k taut. If the spring becomes slack, it can be tightened up by turning the screw e^5 in the block t. A screw f^5 is threaded in the block t, extends to and bears upon a block f^6, that is connected by a spring f^7 with a projection f^4 upon the pillar f^3. The screw f^5 is to tighten the spring f^7, which spring acts upon the plate u to tighten the belt l in the same manner that the spring e^7 acts upon the plate v to tighten the belt k. I prefer that the pulleys e' and f' shall have separate supports in order to be able to tighten the respective belts independently of each other, which could not be done if said pulleys were on the same support.

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

1. A vertical shaft, two pulleys mounted thereon and to be revolved thereby, two carrier-pulleys and their bearings, each of said carrier-pulleys having relation to one of the pulleys on the vertical shaft, and two belts, one passing around each of the pulleys on the vertical shaft and the corresponding carrier-pulley, in combination with two rows of spindles on each side of the machine, the spindles of one of said rows on each side of the machine being adapted to be driven by contact with the outside of one of said belts, and the spindles of the other of said rows on each side of the machine being adapted to be driven by contact with the inside of the other of said belts.

2. A belt, l, and means for driving the same, and two spindles, h h, adapted to be driven by contact with the outside of said belt, in combination with a belt, k, adapted to travel in the same direction as the belt l, means for driving the belt k, and a spindle, g, adapted to be driven by contact with the inside of said belt k, substantially as and for the purpose described.

3. The spindle-rail a^2, the spindle g mounted thereon, the plate o, the spindles h h, mounted in the plate o, and means for sliding the plate o to move the spindles h h into contact and out of contact with their driving-belt, in combination with the belts k and l, and means for driving the same, substantially as and for the purpose described.

4. The spindle-rail a^2, the spindle g, the spindles h h, the belts k and l, running in the same direction and approximately parallel with each other, the inner surface of one of said belts being adapted to drive the spindle g by contact therewith, and the outer surface of the other of said belts being adapted, by contact therewith, to drive the spindles h h in a direction opposite to that in which the spindle g is driven, means to drive the belts, the guard-pulleys j, the pulleys i, and the pressure-pulley g', and means to press the same against the belt k, in combination with means, brought into action on the breakage of a thread, to relieve the spindles from the pressure of their respective belts.

5. The rail a^2, the spindle g, the sliding plate o, the spindles h h upon the plate o, and means for driving the spindles, in combination with the yielding brake o', upon the plate o, the support n', the brake n^2, free to rock on the support, and having the brake-fingers n^3, and means to relieve the several spindles of their driving means upon the breakage of a thread, and, through the movement of the sliding plate o, bring the yielding brake o' into contact with the spindle g, and bring the spindles h h into contact with their respective brake-fingers n^3, substantially as and for the purpose described.

6. A vertical shaft, two pulleys mounted thereon and to be revolved thereby, two carrier-pulleys having distinct and independent supports, one of said carrier-pulleys having relation to each of the pulleys on the vertical shaft, two belts, one passing around each of the pulleys on the vertical shaft and the corresponding carrier-pulley, and guide-pulleys to control the line of one of said belts, in combination with two rows of spindles on each side of the machine, the spindles of one of said rows on each side of the machine being adapted to be driven by contact with the outside of one of said belts, and the spindles of the other of said rows on each side of the machine being adapted to be driven by contact with the inside of the other of said belts.

7. In a machine of the class described, the support n' and the brake n^2, free to rock on the support, and having the brake-fingers n^3, in combination with the two spindles h h, and means to bring such spindles h h into contact with their respective brake-fingers n^3 after the spindles h h are relieved of their driving means, substantially as and for the purpose described.

8. A vertical shaft, two pulleys mounted thereon and to be revolved thereby, two carrier-pulleys having distinct and independent bearings, each of said bearings being independently adjustable in relation to its distance from the vertical shaft, and one of said carrier-pulleys having relation to each of the pulleys on the vertical shaft, in combination with two belts adapted to revolve spindles, one of said belts passing around each of the pulleys on the vertical shaft and the corresponding carrier-pulley, and two rows of spindles on each side of the machine, the spindles of one of said rows on each side of the machine being adapted to be driven by contact with the outside of one of said belts, and the spindles of the other of said rows on each side of the machine being adapted to be driven by contact with the inside of the other of said belts.

9. The guard-pulleys j, the spindle g and its pillar, the belt k, and means for driving the belt, in combination with the pressure-pulley g', the bracket g^2, supporting the pressure-pulley g', and mounted on and free to turn upon the pillar of the spindle g, and the spring g^3, having one of its ends fixedly secured, and its other end pressing against the bracket g^2, substantially as and for the purpose described.

10. The guard-pulley j, the spindle g and its

pillar, the belt k and means for driving the belt, in combination with the pressure-pulley g', the bracket g^2, supporting the pressure-pulley g' and mounted on and free to turn upon the pillar of the spindle g, the spring g^3, having one of its ends fixedly secured and its other end pressing against the bracket g^2, and means, brought into operation when the parts are to be stopped, to cause the pressure-pulley g' to cease to press the belt k against the spindle g, substantially as and for the purpose described.

11. The spindle-rail a^2, the sliding plate o, the spindles h h mounted on the sliding plate o, and a belt to drive the spindles h h, the rod p, capable of being moved vertically, and means, brought into action by the vertical movement of the rod p, to move the sliding plate o alternately outward and inward, and thereby move the spindles h h alternately out of contact with and into contact with their driving-belt in combination with the support n' and the brake n^2, free to rock on the support, and having the brake-fingers n^3.

12. A row of spindles to twist single threads, a row of spindles to receive and twist the doubled threads into which said single threads are formed, two belts, running in the same direction and approximately parallel with each other, and means to drive said belts; the outer surface of one of said belts being adapted, by contact therewith, to drive the spindles composing one of said rows, and the inner surface of the other of said belts being adapted, by contact therewith, to drive the spindles composing the other of said rows in a direction opposite to that in which the spindles of the first row are driven.

13. A series of groups of three spindles each, two of the spindles of each group being adapted to twist single threads and the third spindle of each group being adapted to twist a doubled thread, said groups of spindles being so located as to form two rows of spindles on each side of the machine, the spindles to twist the single threads forming one row, and the spindles to twist the doubled threads forming the other row, two belts, running in the same direction and approximately parallel with each other, and means to drive said belts, the outer surface of one of said belts being adapted, by contact therewith, to drive the spindles composing one of said rows, and the inner surface of the other of said belts being adapted, by contact therewith, to drive the spindles composing the other of said rows, in combination with means to stop the twisting operation of any individual group of said spindles upon the breakage of a thread.

JOSEPH E. TYNAN.

Witnesses:
RALPH TURNER,
JOHN E. SEAZER.