

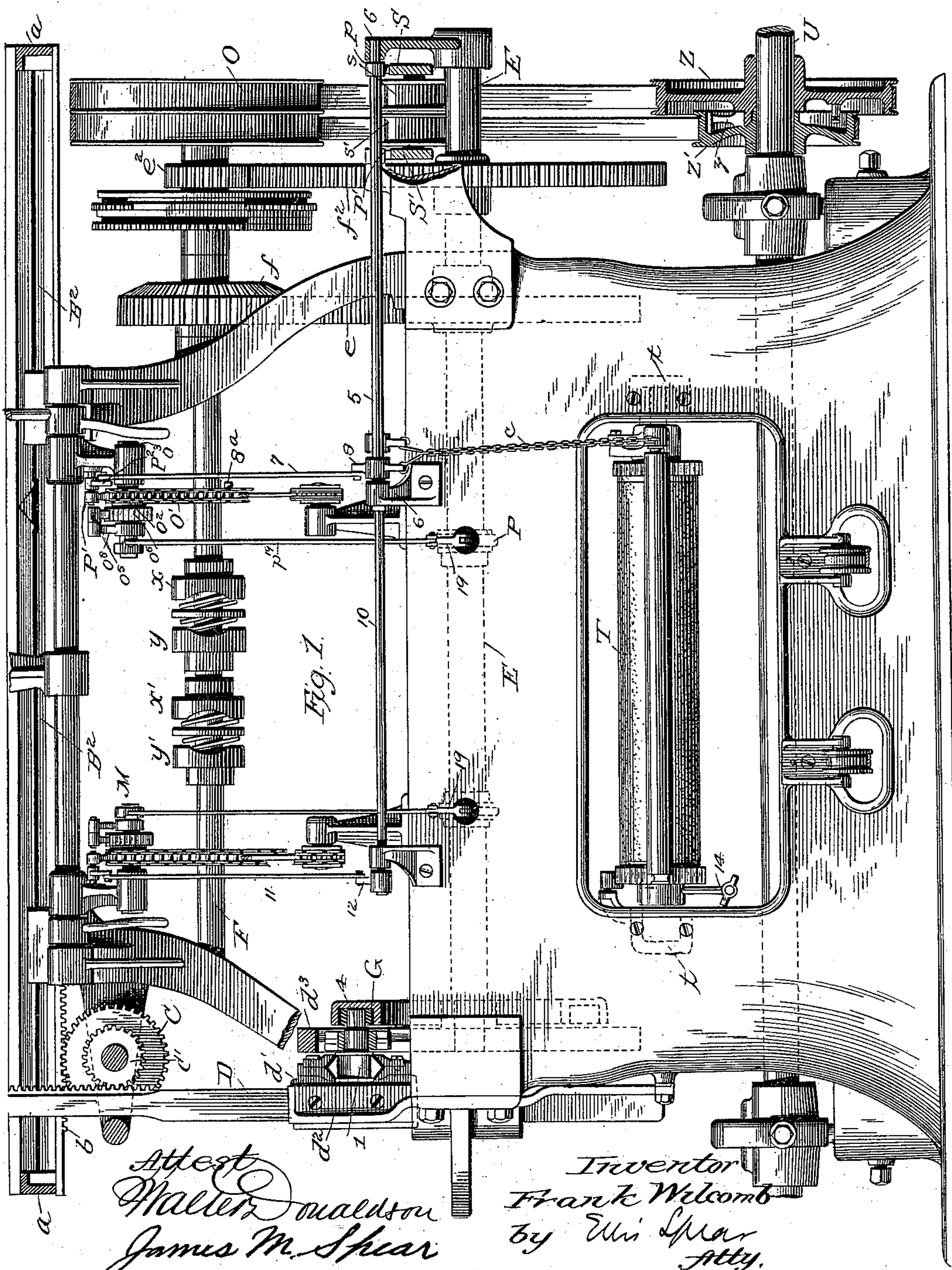
(No Model.)

3 Sheets—Sheet 1.

F. WILCOMB.
STRAIGHT KNITTING MACHINE.

No. 408,562.

Patented Aug. 6, 1889.



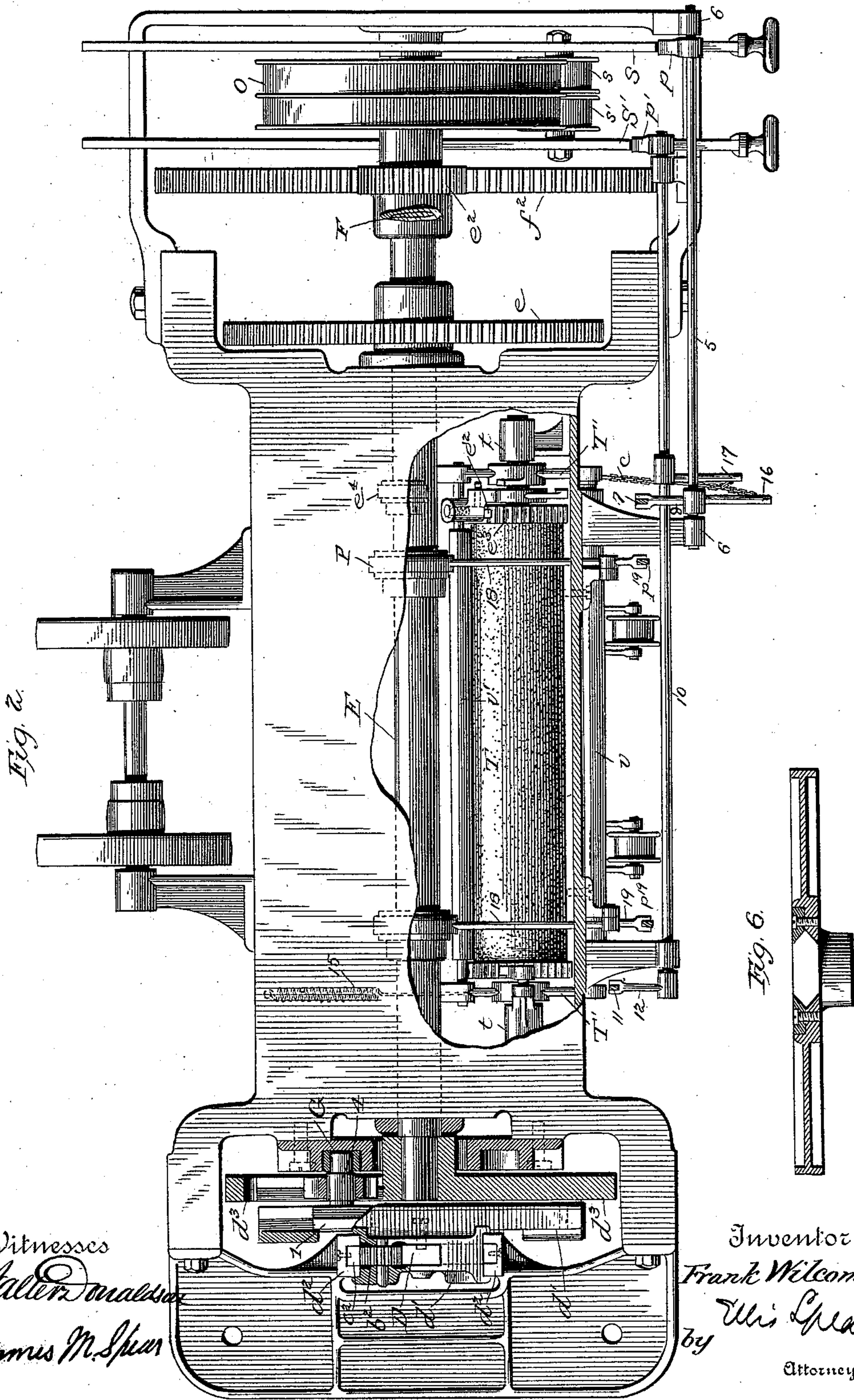
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3 Sheets—Sheet 2.

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No. 408,562.

Patented Aug. 6, 1889.



Witnesses
Walter Donaldson
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Attorney

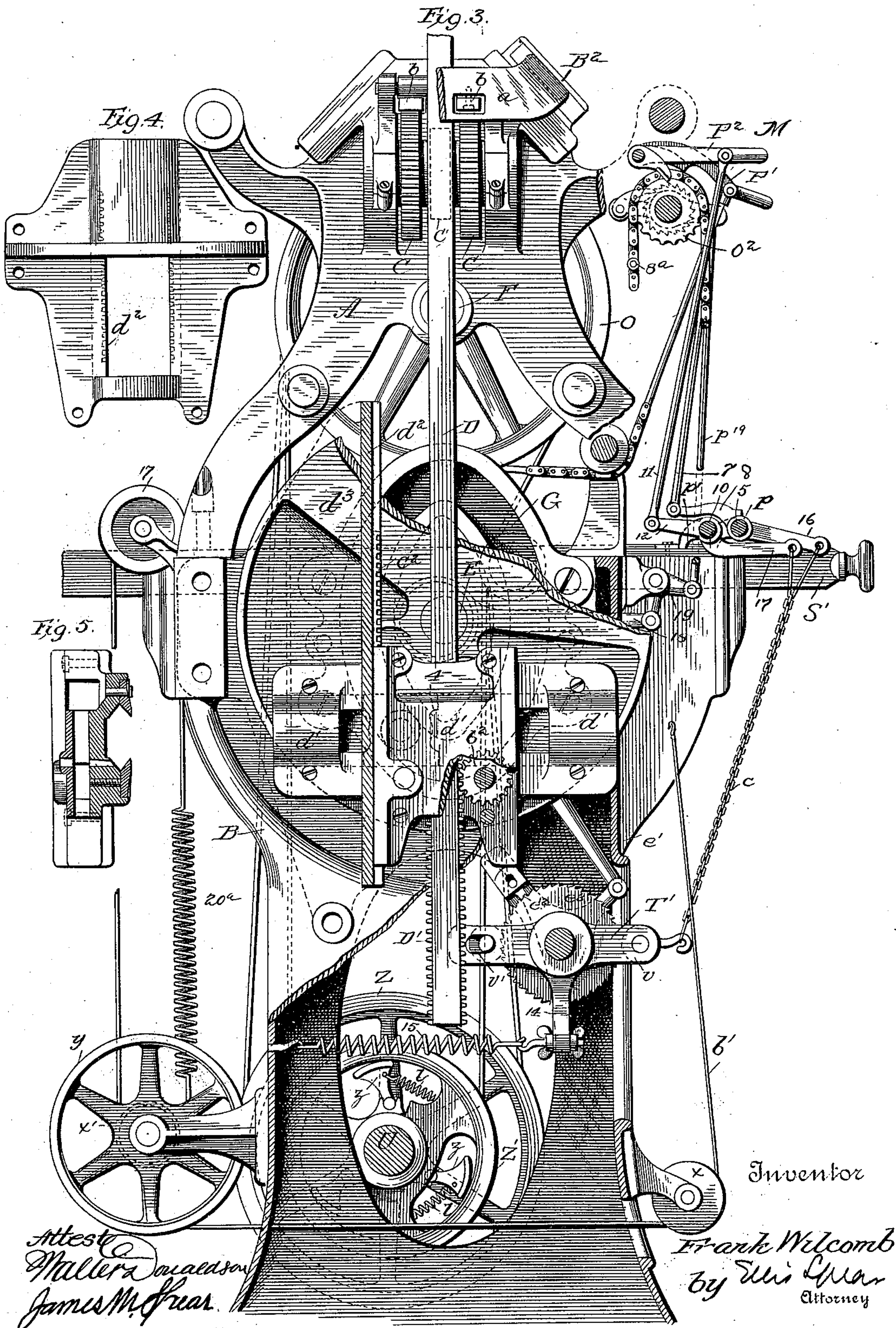
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3 Sheets—Sheet 3.

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STRAIGHT KNITTING MACHINE.

No. 408,562.

Patented Aug. 6, 1889.



UNITED STATES PATENT OFFICE.

FRANK WILCOMB, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE WILCOMB KNITTING MACHINE COMPANY, OF JERSEY CITY, NEW JERSEY.

STRAIGHT-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,562, dated August 6, 1889.

Application filed April 22, 1889. Serial No. 308,107. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILCOMB, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Straight-Knitting Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My object is principally to provide means for automatically controlling and stopping the movement of knitting-machines, said means being intended for use in connection with fashioning-machines, so that the speed may be automatically reduced when the fashioning or shaping begins and the machine stopped entirely when the garment is completed or when the work is removed or runs off the needles. I have shown the mechanism in combination with a universal machine, or one adapted by narrowing or widening at both ends to make any desired garment; but it will be understood that the invention may be applied to a machine which shapes at only one.

The invention includes driving mechanism with automatically-operating means for changing the speed when the fashioning begins, and stop mechanism and tension devices for the fabric.

In the drawings, Figure 1 is a side elevation, Fig. 2 is a plan view, and Fig. 3 an end elevation, of a knitting-machine embodying my invention, parts in each view being in section and some removed and broken away. Figs. 4, 5, and 6 are detail views of parts.

In the drawings, A is the upper and B the lower supporting-frame.

B² are the slide-bars, connected by cross-braces *a a*.

F is the cam-shaft, carrying four sets of shifting-cams *x x' y y'*, similar to sets of cams *x y* shown in Letters Patent of the United States granted to me on the 18th day of June, 1889, No. 405,638, the duplicate sets being intended for fashioning at both ends of the machine instead of at one end only, as in that application.

The machine is driven normally from a belt-wheel Z fixed on the shaft U. The belt

from this pulley passes about the double pulley O, which is loose on the cam-shaft F. This pulley has a pinion *e*² formed thereon, which drives the shaft E through the gear *f*², and the cam-shaft is driven from the shaft E by gears *e* and *f* on the shaft E and cam-shaft, respectively. The shaft E also drives the slide-bars, for which purpose it has a face-wheel *d*³, connected by a stud 4 and sliding block 1 directly to a cross-head *d'*, which moves in ways *d*², secured to the frame. These ways are on a bracket, a front view of which is shown in Fig. 4. The cross-head is channeled to receive the block 1. Fig. 5 shows the cross-head in central vertical section. The cross-head's movement is transmitted to the slides by rack-bar D, pinion C', gears C C, and racks *b b*. In order to render the movement uniform, the face-plate is slotted to receive a sliding block on the pin 4, and said pin projects into a cam-groove G, which, as shown, will cause the pin to move away from and toward the center of motion, thus controlling the imparted movement. Fig. 6 shows a section through the face-plate, taken across the slot. Multiplying mechanism is used with this connection, consisting of cross-head pinions *b*² and racks D' and *c*² on the bar D and guides *d*², respectively. The bar D reciprocates through the cross-head, and the channel for the sliding connection is located to one side of the vertical plane of the said bar.

Alongside the pulley Z is a second smaller pulley Z', this being loose on the shaft and adapted to be driven from the pulley Z by clutch-blocks *z*, arranged in sockets on the main pulley and between the two. Springs *l* keep the clutch-blocks of the pulley Z in engagement with the inner periphery of the supplemental pulley. This pulley, also, is connected to the intermediate pulley O by a belt, and both belts pass by pulleys *s s'*, carried by rods S S'. The rods are held in normal position to keep the belts tight by pawls *p p'*, and when so held the full motion is transmitted through the main pulley Z, the other pulley being smaller and running in advance of the larger one, the clutch-blocks being arranged to slip for the purpose. When, however, the pawl *p* is released and the belt freed, the

clutches will operate, and the machine will thus be driven from the smaller pulley at a reduced rate of speed. The pawl is operated automatically, and in the present instance I
 5 utilize the main pattern-chain O' for the purpose, said chain being lettered similarly in my previous application and acting upon a lever P' for setting in operation the fashioning mechanism. The chain and its sprocket
 10 O^2 are supported by a bracket o^3 , and said sprocket is operated by an eccentric P on the shaft E , through rod 18, bell-crank 19, rod p^{19} , disk o^8 , and ratchet and pawl $o^6 o^5$. The holding-pawl p is on a rock-shaft δ , which is in bearings 6 6 and connected to a pivoted arm P^2 by
 15 a rod 7 and arm 8 on the rock-shaft. The arm P^2 is also supported by the bracket o^3 close to the pattern-chain O' , to be operated by a projection 8^a on said chain. This is located just
 20 in advance of the projections on the chain for operating the lever P' , which connects with the fashioning mechanism, so that the speed is reduced before the fashioning begins. For
 25 stopping the machine when the garment is finished, the other pawl p' is thrown out, for which purpose it is fixed to a second rock-shaft 10, extending to the other end of the machine.

The pattern mechanism is duplicated, as
 30 shown at M at this end of the machine, and the second rock-shaft is connected therewith, to be operated in a manner similar to that above described by rod 11 and arm 12. The pattern-chain (similar to the one O' , first men-
 35 tioned) sets the fashioning devices in operation at this end M of the machine. This chain is operated from the shaft E by mechanism similar to that described for the first chain.

While I have shown the operating-con-
 40 nections as extending from the pawls to the two sets of pattern mechanisms, it will be understood that the invention may be applied to a machine which fashions at only one end, in
 45 which case both pawls would be connected in the same way to their operating-arms, and these would be arranged to be operated from the same chain.

The means whereby the machine is stopped when the work is removed from the needles
 50 or runs off the same is now to be described. T is the take-up roller, supported in bearings t and operated from the shaft E by an eccentric e^4 , eccentric-rod e' , pawl e^{12} , and ratchet e^3 . On the shaft of the roller at each end is
 55 a loose arm T' , and these have bearings in which rollers $v v'$ are journaled. The fabric from the machine passes down outside and under the roller v , thence up over the take-up roller, and down between it and the
 60 presser-roller v' on the other side. This tends constantly to lift the front roller v , and in order to apply a tension to the work the loose arm T' has an extension 14, to which a spring 15 is connected, this acting to keep the roller
 65 down. The other loose arm T' is connected with both pawls $p p'$ through their rock-

shafts by a chain c and arms 16 17 on the shafts. When the thread breaks and the work runs off the needles, the loosened fabric allows the spring 15 to move the arms T' , and
 70 thus throw out both pawls $p p'$. I have shown, also, a tension device adapted to engage the widened portion of a fabric—as, for instance, the upper part of a sleeve. This consists of
 75 a band b' , to which the start-hooks are attached, said band running about a roller x to a drum y . A second band runs from a small pulley x' on the drum over a pulley 17 to a spring 20^a, and by this arrangement the ten-
 80 sion of the spring is variable to suit the decreased width of the fabric as it is narrowed.

It will be understood that the low-speed connection may be fast and the high-speed loose and the same mechanism employed to
 85 change from a low to a high speed, instead of as referred to, this being a mere reversal of the mechanism above described.

I claim as my invention—

1. In a knitting-machine adapted to fashion, means for driving the same at a normal rate
 90 of speed for plain knitting, means for driving at a lower rate of speed for fashioning, a pawl for holding the high-speed connections in operation, a pattern mechanism and connec-
 95 tions between the pawl and said mechanism for releasing the high-speed connection, and an automatically-operating clutch for driving the low-speed connection when the high-speed is released, substantially as described.

2. In a fashioning knitting-machine, the
 100 fast and loose pulleys, the belt-connections therefrom, means for releasing the belt of the fast pulley, and an automatic clutch in engagement with the loose pulley for driving the same, substantially as described. 105

3. In combination with a high-speed driving-connection, a low-speed driving-connection, a pawl for holding the high-speed connection to work, a rock-shaft carrying said
 110 pawl, pattern mechanism, and operating connections from the rock-shaft to the pattern mechanism, substantially as described.

4. In combination, in a fashioning-machine, high and low speed driving-connections, a
 115 pawl for holding the high-speed connection to work, a pattern mechanism for setting in motion the fashioning devices, and connections between said pawl and the same pattern mechanism which operates the fashioning de-
 120 vices.

5. In combination, the two pulleys, the belt-connections to impart different rates of speed to the machine, means for releasing one belt-connection, automatic means for rendering
 125 the other belt-connection operative, and automatic means for releasing said last-named belt-connection, substantially as described.

6. In combination, the driving-connections, the movable roller for the fabric, a pawl for
 130 holding the driving-connections to their work, and a connection between said movable roller and said holding-pawl, whereby the machine

is stopped when the fabric is removed from the needles, substantially as described.

7. In combination, the two driving-connections, the pawls for holding said connections to their work, pattern mechanism and connections to one pawl for rendering one set of driving-connections inoperative, an automatic clutch for rendering the other set operative, the movable roller for the fabric, and connections therefrom to the pawls for releasing both sets of driving means when the thread is removed from the needles.

8. The tension device for the widened portion of the fabric, consisting of the band b' , the drum y , the pulley x' , and the spring, and the connection between the spring and pulley x' , substantially as described.

9. In combination, the slides, the cross-head having a channel, connections between the cross-head and slides, the slotted face-plate, the sliding connection between the face-plate and cross-head, and a cam having a groove G , said groove being adapted to receive the projecting portion of the sliding connection, substantially as described.

10. In combination, the slides, the face-plate, the cross-head, the connections from the cross-head to the slides, the bar D , sliding through the cross-head, the multiplying mechanism, the said cross-head having a channel to one side of the bar D , and the direct connection 4 between the cross-head and the face-plate.

11. In combination, the movable roller for the fabric, the two driving-connections, the pawls for holding said driving-connections to their work, and connections between the movable roller and the holding-pawls for releasing both driving-connections when the thread is removed from the needles.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK WILCOMB.

Witnesses:

DANIEL MCNIVEN,
MILLARD F. MUNROE.