No. 698,091. Patented Apr. 22, 1902.

F. WILCOMB.

STOP MOTION FOR KNITTING MACHINES.

(Application filed Apr. 24, 1901.)

(No Model.) 3 Sheets—Sheet 1.

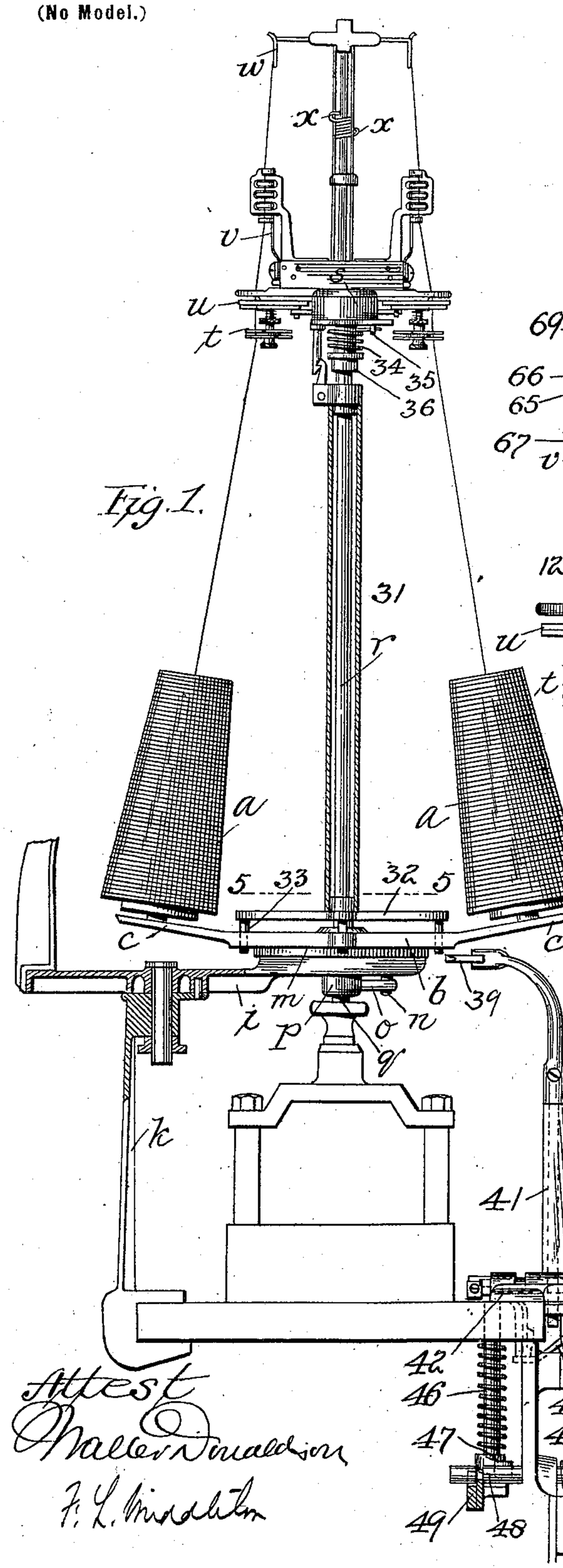

Fig. 1.

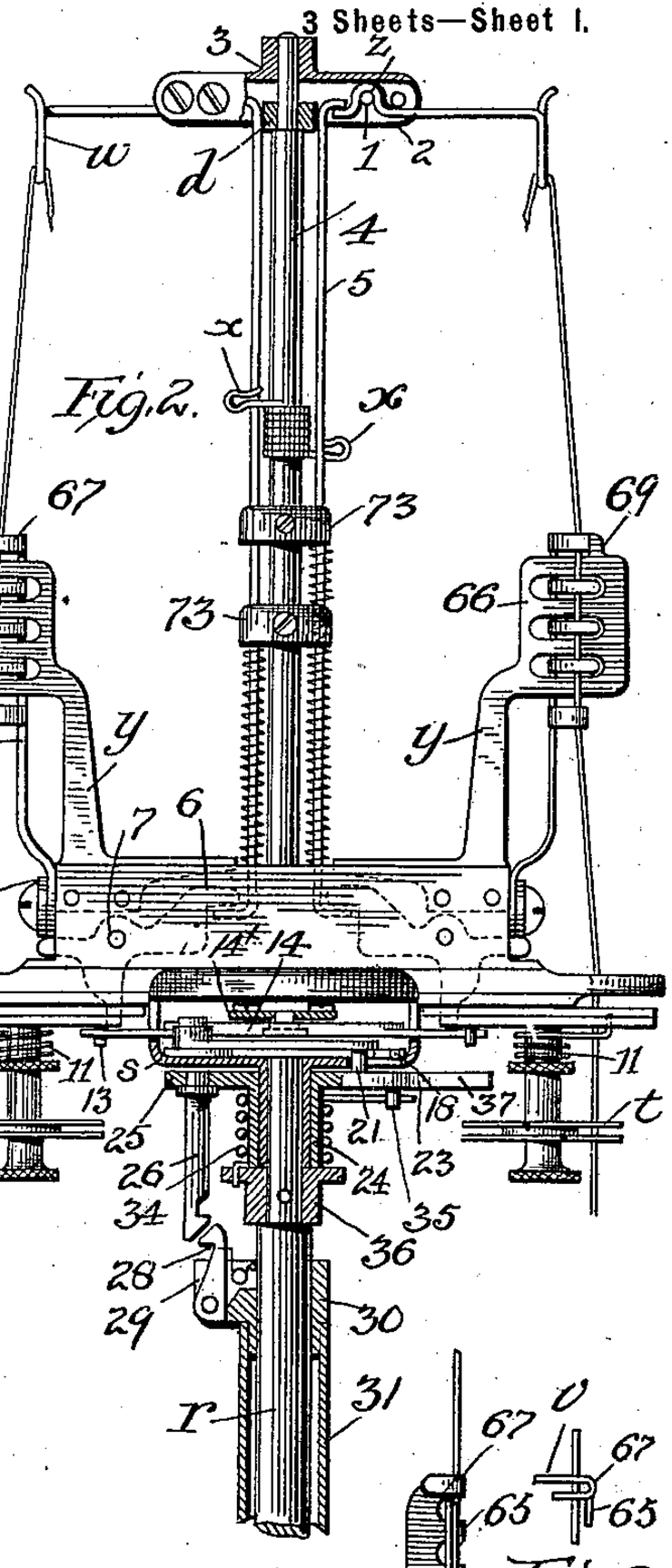

Fig. 2.

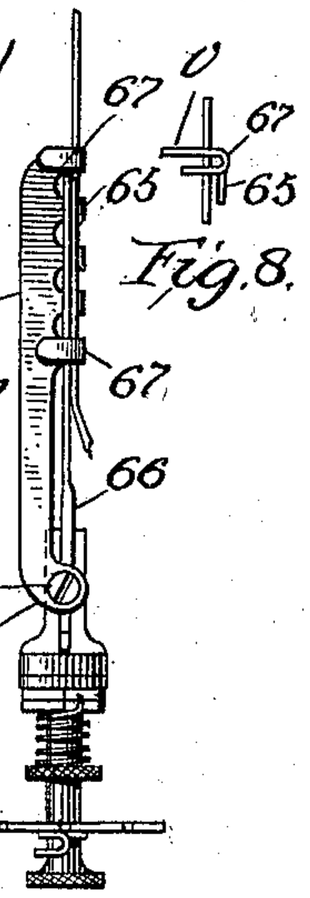

Fig. 8.

Fig. 7.

Attest
Waller Donaldson
F. L. Middleton

Inventor
Frank Wilcomb
by Ellis Spear
Atty

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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

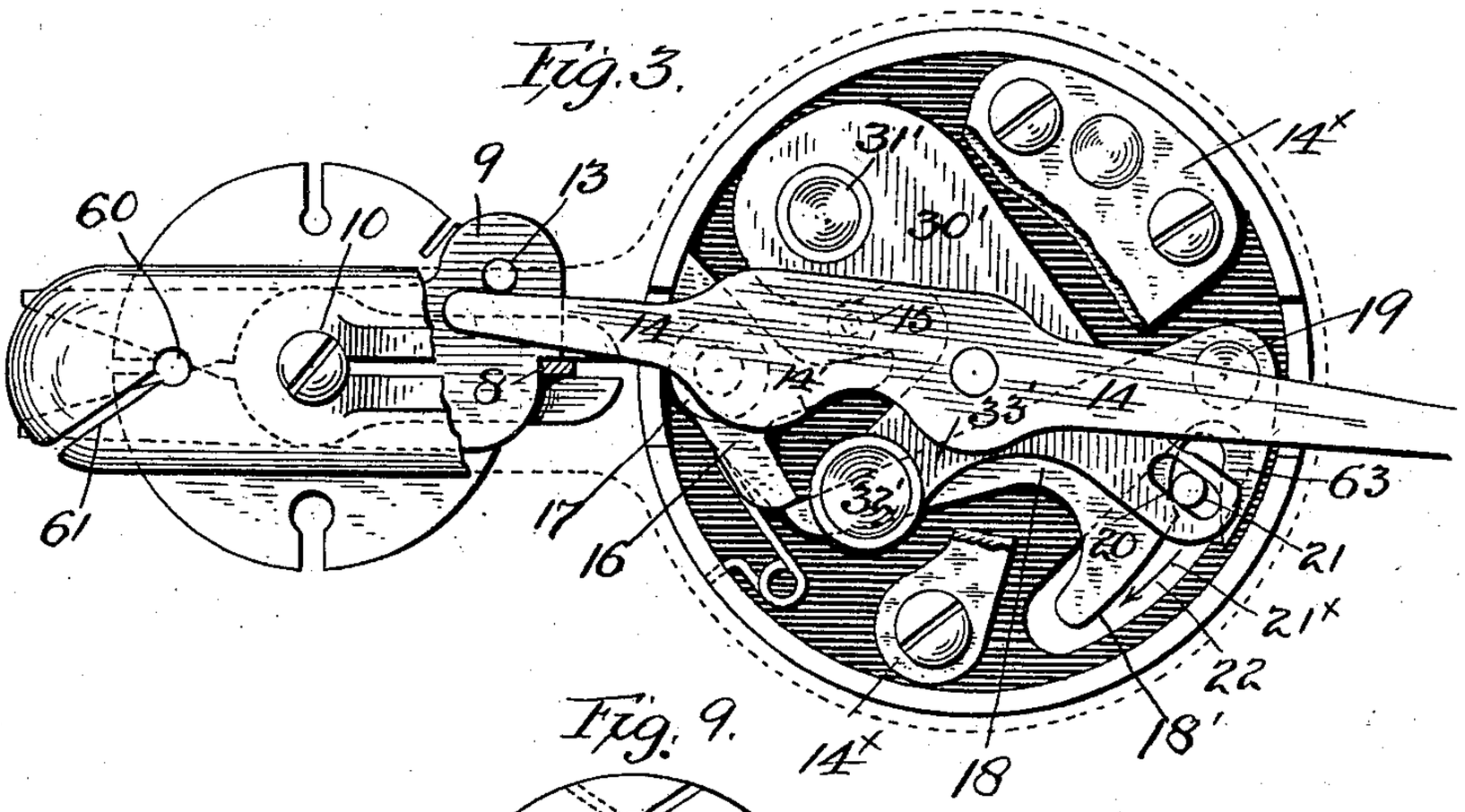

Fig. 9.

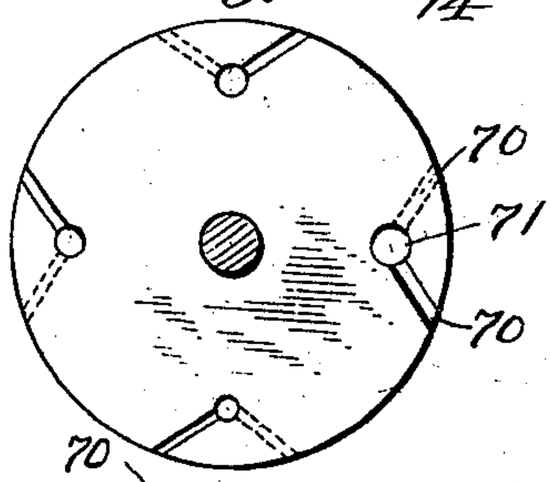

Fig. 10.

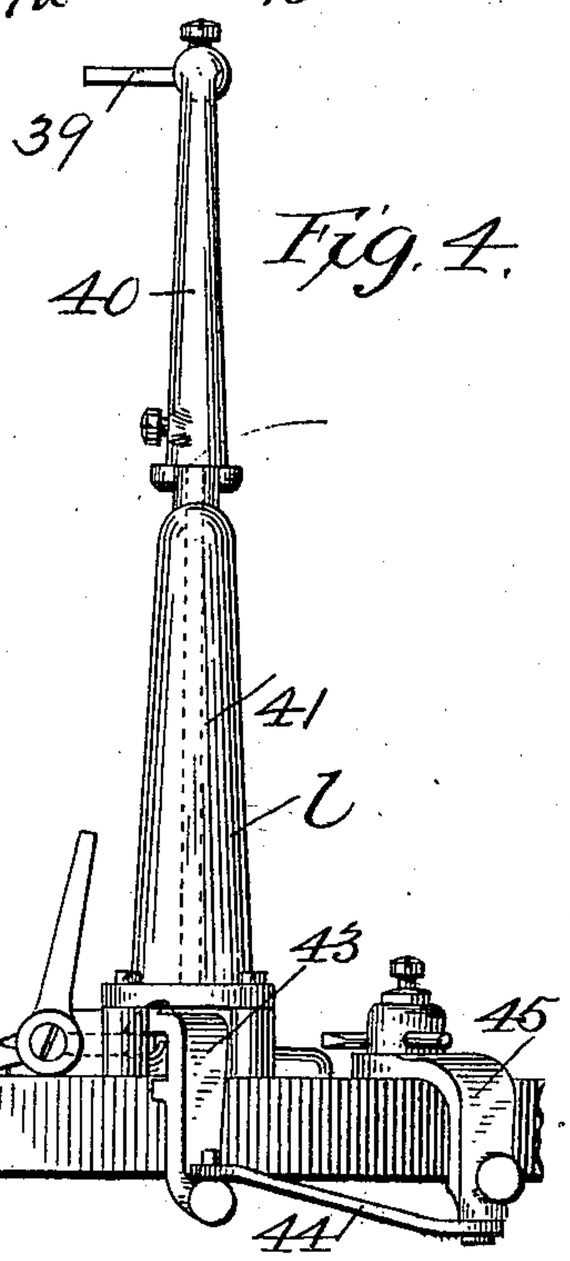

Fig. 4.

Attest
Walter Donaldson
F. L. Middleton

Inventor
FRANK WILCOMB
by Ellis Spear
Atty.

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Fig. 5.

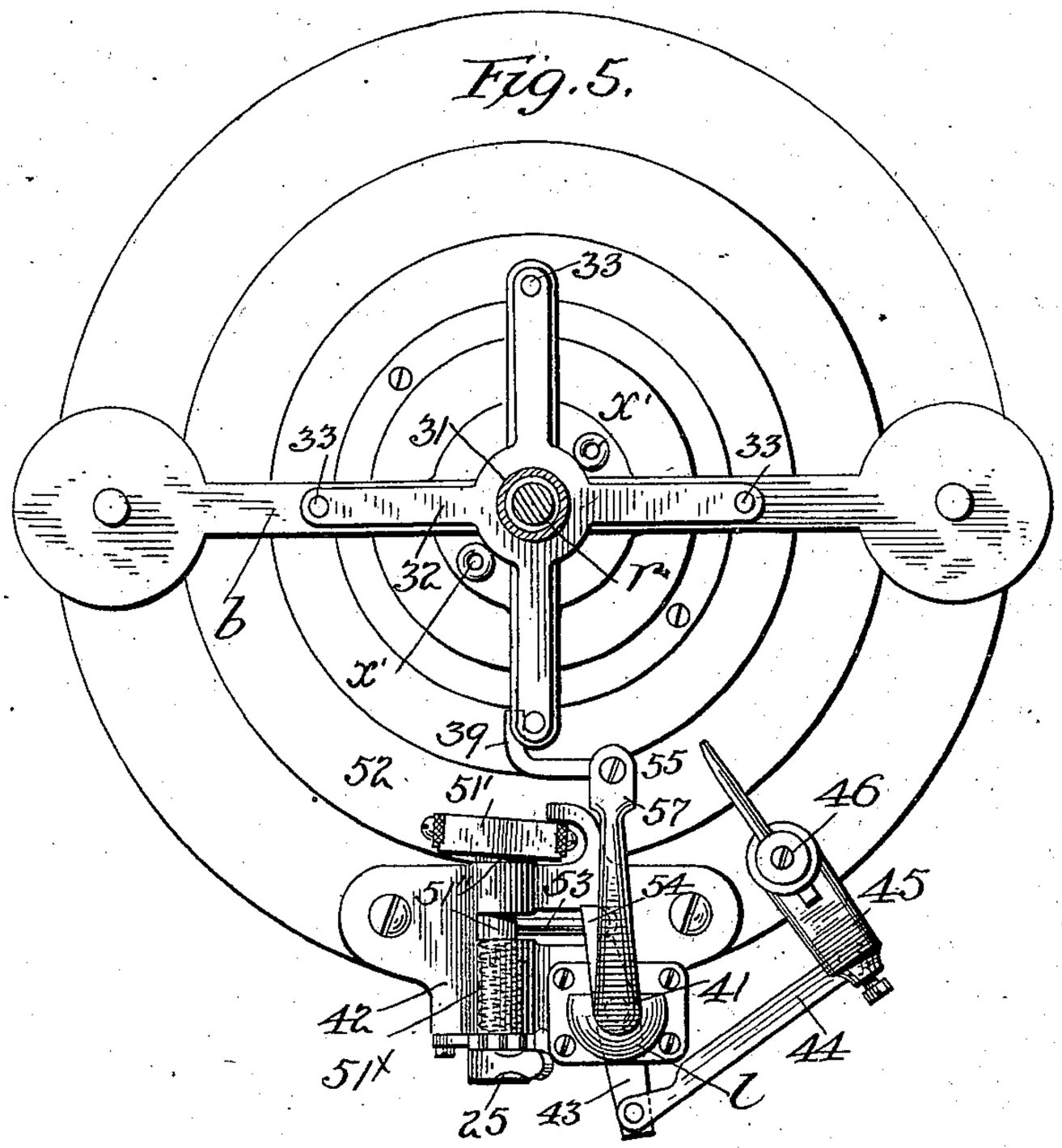
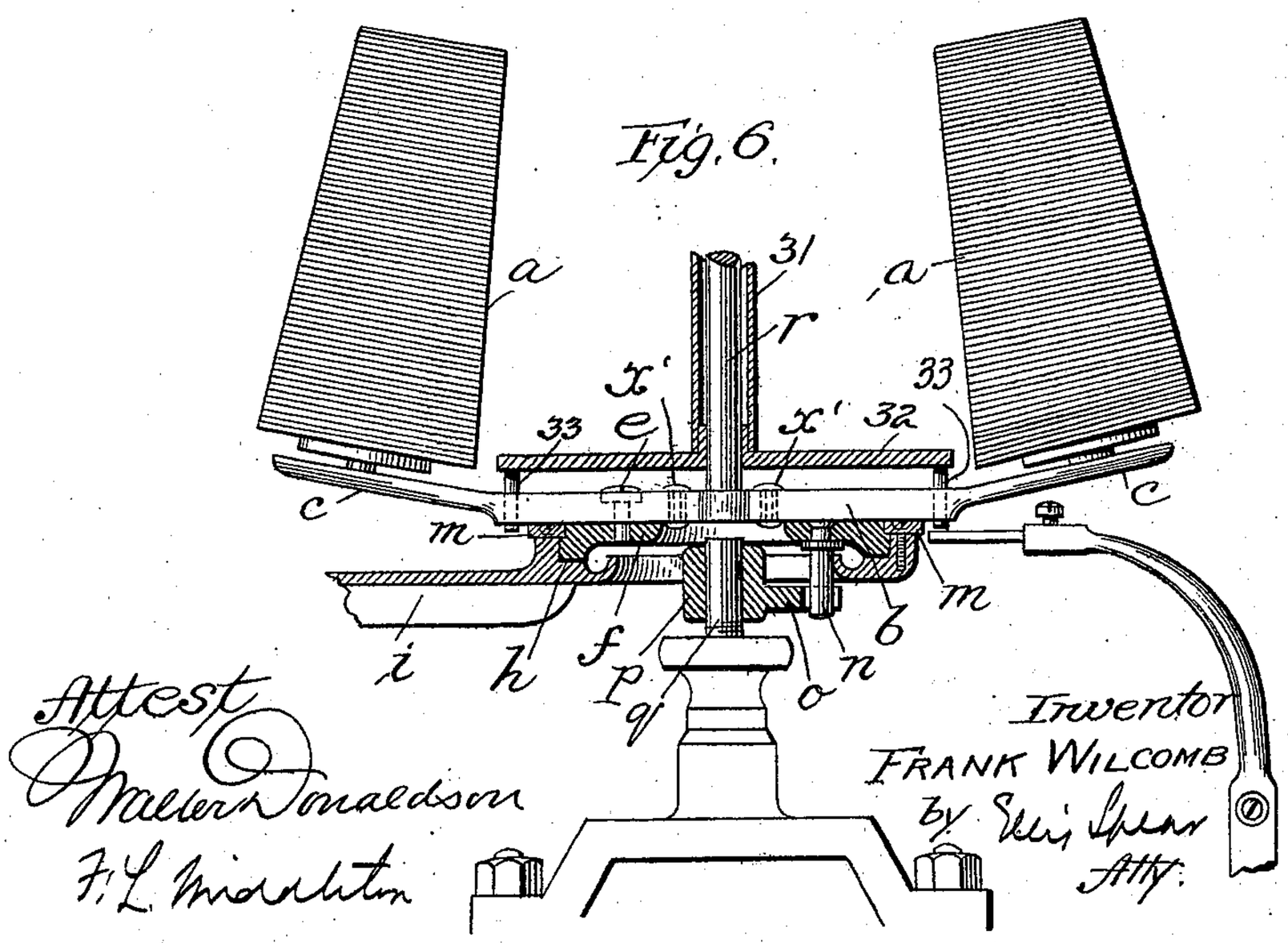


Fig. 6.



UNITED STATES PATENT OFFICE.

FRANK WILCOMB, OF NORRISTOWN, PENNSYLVANIA.

STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 698,091, dated April 22, 1902.

Application filed April 24, 1901. Serial No. 57,303. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILCOMB, a citizen of the United States, residing at Norristown, Montgomery county, Pennsylvania, have invented certain new and useful Improvements in Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to stop-motions for knitting-machines, and particularly to that form in which rotary bobbins are employed, though some of the features of improvement are applicable to other styles of machines.

In some respects my present invention is an improvement upon that disclosed in application for Letters Patent of the United States filed by me November 2, 1900, No. 35,272, said improvement relating more particularly to the tripping mechanism of the stop-motion head.

My present invention includes other important features, as will be particularly pointed out hereinafter.

One of the chief features of this invention is a revoluble bobbin-stand made to revolve in unison with the revolutions of the machine without supporting the bobbins directly on the revolving parts of said machine.

It is well understood that when the bobbin-stand and the bobbins of yarn and overhead connections are attached directly to the spindle or revolving parts of the machine the unequal weight between the bobbins of yarn, of which some are partly empty, and the lack of perfect balance of the bobbin-stand and overhead connections causes objectionable vibrations and increased wear of the revolving parts of the knitting-machine, resulting frequently in imperfect knitting and rapid destruction of the working parts. By my improved construction a stand or support is used to sustain all the weight of the bobbins, bobbin-stand, stop-motion, and connections and to give greater stability and steadiness to the revolving bobbins, stop-motion, and other parts. The rotation is governed by the driving device, which is attached to the spindle or other moving part of the knitting-machine.

To avoid as much as possible any wabbling of the bobbin-stand and the stop-motion, I make the rotating plate of the stand preferably of a large diameter, and this also allows of inserting thread-eyes for the passage of the yarn from the bobbins to the needles through the rotating plate well inside of the bearing-surfaces, the rotation of the revolving bobbin-stand carrying the thread-eyes in the proper relation to the thread-carriers of the machine.

By my arrangement the threads are carried down within the axis or bearing of the rotary bobbin-stand.

In the drawings, Figure 1 is a side view of a knitting-head with my improvements in place. Fig. 2 is an enlarged view of the stop-motion head and upper structure. Fig. 3 is a plan view of the tripping mechanism of the knitting-head, some of the parts being broken away and some omitted. Fig. 4 is a detail side view of the connection between the stop-motion and the brake mechanism. Fig. 5 is a sectional plan view on the line 5 5 of Fig. 1 with the bobbins omitted. Fig. 6 is a detail view, partly in section and partly in elevation, of the supporting means for the rotary bobbin-stand and the connection between the same and the spindle of the knitting-head. Fig. 7 is a detail front view of the feeler-finger, guard, and adjacent parts. Fig. 8 is a detail plan view of the guard and feeler-finger. Figs. 9 and 10 are detail views relating to the knot-catcher.

The bobbins *a* are carried by arms *c* of a stand *b*, which consists of a central head, to which is attached by screws *e* a ring *f*, the outer rim of which bears upon an annular shoulder *h* on a fixed bracket *i*, which is supported by the post *k*, fixed to the base-ring of the machine. The ring *f*, which is adapted to rotate upon the shoulder *h*, is held in place by the gib *m*, screwed to the bracket. The ring is rotated by a pin *n*, depending therefrom and engaging a forked arm *o* of a collar *p*, fixed to the rotating spindle *q*, which is carried by the rotary head of the machine. A central standard *r* extends up from the rotary head *b* of the bobbin-stand, and this carries at its upper part the stop-motion head and attached devices. This stop-motion head comprises a casing *s*, attached to the standard to rotate therewith and containing the tripping mechanism, to be hereinafter described.

The yarn from the bobbin passes first

through the thread-gage *l*, thence through shearing devices *u* to feeler-fingers *v*, sweeps *w*, eyes *x*, and thence to the needles through the hollow axis of the bobbin-stand, the guide-eyes for directing the thread through said axis being shown at *x'*, Figs. 5 and 6. The thread-gages, shears, and feeler-fingers, with their guide-fingers *y*, are all supported from the stop-motion head, as will be described.

The sweeps consist of wires having a semicircular bend at *z*, fitting over their pivot-pins 1, which extend through the arms 2 of the block 3, secured to the reduced extension 4 of the standard *r*, above mentioned.

The sweeps are held in by their bent portions engaging the upper wall of the arms 2. The inner ends of the sweeps engage the hooked ends of the rods 5, which extend down into the stop-motion head, so that their lower hooked ends may engage detent-levers 6, pivoted within the stop-motion head at 7, the lower arms of each of said detents engaging normally the shoulder 8, Fig. 3, of the movable shear-blade 9, which is pivoted at 10 and is under tension of the spring 11, tending constantly to close the shears and sever the yarn, which tendency is resisted by the detent. The rods 5 are held in proper position by the collar *d*, fixed to the standard, which collar affords a backing for the rods.

When the sweep is pulled down owing to the yarn becoming taut, the detent-lever will be withdrawn from the movable shear-blade, and the same will close under the action of its spring. The same result will be accomplished when the thread fails, for then the feeler-finger, which is pivoted to the stop-motion head at 12, will fall and its lower eccentric end 68 will engage the detent-lever and throw it out of connection with the shear-blade. When the shear-blade moves, a pin 13 thereon will operate the swinging lever 14, which is pivoted centrally of the casing *s*. This lever carries on its under side a pin or roller 15, Fig. 3, which will operate a spring-pressed detent 16, pivoted within the casing at 17, whereupon a catch-lever 18, pivoted within the casing at 19, will be released. This catch-lever has a shoulder 20, adapted to hold a pin 21, which extends up through a slot 22 in the bottom of the casing from a tripping-lever 23. This tripping-lever is pivotally supported on the standard by its hub 24, fitted to turn about the standard. The tailpiece 25 of this lever carries a catch-pin 26 rigidly, which extends downwardly therefrom and is normally engaged by a spring-pawl 28, pivoted in a slot 29 of the block 30, which is fitted to slide on the standard and is attached to the hollow stem 31 of a tripping-foot 32, having a series of pins 33 extending down through the arms of the bobbin-stand. The said stem encircles the standard *r*, and it and the tripping-foot are thus arranged centrally of the bobbin-stand and rotate therewith.

The tripper-lever 23 is under tension of a spring 34, encircling the standard, one end engaging a pin 35 of the lever and the other end being held by a collar 36, secured to the standard.

It will now be understood that the release of the catch-lever 18, as described, when the shears operate will allow the pin 21 and the tripping-lever 23 free movement under the action of the tripping-spring 34, and the catch 26 will be withdrawn from the pawl 28, thus allowing the tripper-foot 32 to fall by gravity to thrust the pins 33 downwardly, so that in the continued rotation of the bobbin-stand one of these pins will engage and operate the connections leading to the shipper connections. Before describing these connections, however, I will make clear how the shears are automatically reset upon the operation of the tripping mechanism.

The pin 21 is connected with a lever 30', pivoted within the casing *s* at 31', and a roller or stud 32' on the arm 33' of this lever is arranged in the path of the swinging lever 14, and when the pin 21 moves in the direction of the arrow $21^{\times}$, Fig. 3, the lever 30' will move with it, and in the final movement of the parts the roller 32' will return the lever 14 to normal position by rolling along the cam-surface 14' of the lever 14, and thus through the pin 13 will reset the movable shear-blade 9 to its open position. In resetting the trip mechanism the pin 21 is moved, as will be hereinafter described, in a direction opposite to the arrow direction $21^{\times}$, and in this movement it strikes the curved edge of the finger 63 of the catch-lever 18 and operates the same so that the catch-lever will be caught and held by the detent 16, and then the shoulder 20 will have arrived in position to engage the pin, thus holding the trip mechanism in reset condition. The lever 14 is pivoted to a pin depending from a plate or bracket $14^{\times}$ within the casing *s*. The tripping mechanism, it will be seen, comprises the spring-pressed detent 16, which may be operated by the lever 14 with very little resistance, as the pin 15 of the lever 14 is arranged near the pivotal point of the lever 14, and the catch-lever 18, which is made to rest against the detent 16 at one end, has a long lever-arm between the detent and its pivot 19 and a short lever-arm between the pivot and the point where the pressure of the main tripping-spring is sustained. The main tripping-spring being a strong one it is desirable to avoid the pressure of the lever 18 against the detent 16 in order that the tripping of detent 16 may be easily accomplished. The lever 30' normally extends more nearly parallel with a line drawn through the pivotal points of detent 16 and lever 18 than at right angles to it. The pivot 31' is so located and the lever extends so that the pin 21 swings in an arc which cuts a line drawn between the pivotal point of the lever 18 and the pivot of detent 16. The object of this is to relieve the pressure of lever 18 against detent 16, and, as will be readily seen,

if the locking-shoulder 20 were at right angles to a radial line drawn from the pivot 19 the pressure of the main tripping-spring would exert no pressure whatever on the detent 16, as the pressure of spring 21 would be in direct line with the pivot 19. I, however, make the locking-shoulder 20 slightly inclined, just sufficient to allow the main tripping-spring to swing the lever 18 when the detent 16 is swung from under it, and in this way I secure a very sensitive locking mechanism, easily tripped by swinging the lever 14. The roller 32′, attached to lever 30′, swings in an arc more nearly parallel with the length of the lever 14, and as it rolls along the cam-surface 14′ great power is exerted on this lever 14 to reset the shears and overcome the resistance of the spring which operates them. The lever 18 has a guard-surface 18′, which effectually prevents the lever 18 from becoming locked with detent 16 while the pin 21 is at the opposite end of its travel from that shown in the drawings.

Referring now to the connections leading to the shipper devices, when the tripper-foot 32 falls the pins 33, carried thereby, will be brought into the path of a finger 39, carried by an arm 40, fixed to a rock-shaft 41, journaled at its upper end in the standard 1, before described, and at its lower end in the base-plate 42 of the brake device, to which base-plate the standard is secured. The rock-shaft has fixed thereto an arm 43, which is connected by a link 44 with an arm 45, fixed to the rock-shaft 46, extending down through the fixed base-ring of the machine. This rock-shaft has an arm 47, adapted to engage an incline 48 on the tripper-arm 49, which may be of any suitable construction to engage the shipper-rod 49′. The movement of the parts described will release the shipper-rod, which under the action of its spring 50 will operate the shipper-fork 51. It will be seen that the tripper-foot and its stem being arranged centrally of the machine the bobbin-stand will not be out of balance when rotated, as would be the case were some other form of device used located to one side of the center of the machine. These parts are carried around with the stand as the pins 33 engage said stand, and these pins guide the trip-foot and its stem vertically. For resetting the parts a handle is provided on the tripper-lever at 37, by which it may be turned against the tension of its spring and made to engage the catch-lever 18, after which by sliding the tripper-foot and its stem vertically the spring-pawl will engage the catch-pin 26, and thus hold the tripper-foot up ready for another action.

In order to arrest the machine quickly when the power is thrown off, I employ a friction-brake, comprising a brake-shoe 51′, adapted when operated to engage the rotary flange 52 of the knitting-head, Fig. 5. The head is carried by a shaft 51″ under tension of a spring $51^{\times}$ in the base 42 and held inactive by a latch-pin 53, engaged by a catch 54, secured to the rock-shaft 41, so that when the shaft 41 is operated to shift the driving means the catch-lever 54 will release the latch-pin 53, and the shaft 51″ being free to rotate under the action of its spring will apply the brake-shoe to the rotary base-flange, the shaft having an eccentric end carrying the brake-shoe, as set forth in an application filed by me of even date herewith numbered 57,302.

The arm of the stop-motion head directly above the shears is provided with a guide-eye 60, Fig. 3, to which a narrow slit 61 extends diagonally. This serves to hold the thread in position between the shear-blades.

The feeler-fingers *v* are pivoted to the stop-motion head with a view to preventing centrifugal force from unduly affecting them. They are arranged to fall in a direction opposite to that in which the head rotates, and they therefore operate transversely of the stop-motion head. By reason of this there will be no pressure on the yarn due to centrifugal force exerted through the feelers, and the machine may be run at any desired speed, and at the same time the feelers may be made sufficiently heavy to fall quickly when released.

The feeler has a plurality of fingers 65 extending in one direction to pass into a plurality of openings formed in the guides or guards 66, and it has an upper and lower finger 67 extending in a direction at right angles to the fingers 65 and at points above and below the guide. This arrangement permits threading to be readily performed, while preventing the thread from coming out when once inserted.

The feeler-finger is pivoted eccentrically, as shown in Fig. 7, and in falling its eccentric portion 68 will operate the detent.

The guide-arm has a stop 69 for the upper end of the feeler-finger to prevent its upper end from springing out due to centrifugal force.

I provide an improved form of knot-catcher, Figs. 9 and 10, comprising two disks, having slots 70 extending inwardly from the edge and terminating in an eye 71. The disks are placed one over the other with the eyes in line, but with the slot in one inclining in a direction opposite to that in the other. The disks are spaced apart by a block or piece 72, which leaves a space between them, and in threading the yarn is passed through one slot, then through the space between the disks, and through the other slot to the eyes.

The rods 5, controlled by the sweeps, are pressed by springs, and these are independently adjustable by collars 73 on the standard, the lower collar having an opening through which the spring for the upper collar passes. It will be seen that the rotary bobbin-stand is supported axially over and independent of the knitting-head, this feature making it also independent of the spindle, which is part of the knitting-head.

It will be understood, as before stated, that the rotary bobbin-stand and rotary stop-motion parts are supported independently of all the parts of the knitting-head, which parts include among them the spindle, as well as any other parts of the head which would be affected by the unequal weight or irregular movement of the parts above.

I claim as my invention—

1. In combination in a stop-motion, the movable shear-blade, a lever operated thereby, trip mechanism released by the movement of the lever and means whereby the lever is reacted upon by the trip mechanism to reset the shear-blade automatically by the movement of said lever, substantially as described.

2. In combination, the main trip mechanism, a supplemental trip mechanism, a connection between them whereby the supplemental trip mechanism will operate the main trip, said main trip reacting through the same connection to reset the supplemental trip, substantially as described.

3. In combination, the movable shear-blade, the tripping-spring therefor, a lever in direct engagement with part of said shear-blade, connections controlled by said lever and means whereby the lever is given a reverse movement to thereby reset the shear-blade, substantially as described.

4. In combination, the catch-lever, connections leading to the shipper devices held by said catch-lever, a detent for holding the catch-lever, a swinging lever for operating the detent with means for operating the swinging lever and means for automatically resetting the swinging lever, substantially as described.

5. In combination, the connections leading to the shipper devices, the arm 23 for controlling the same, the spring for applying a tension to said arm, the casing, the pivoted catch-lever within the casing engaging a part on the arm 23, a detent within the casing engaging the said catch-lever with means for operating the detent consisting of a swinging lever pivoted within the casing and detector mechanism controlling the swinging lever, substantially as described.

6. In combination in a stop-motion, connections leading to the shipper devices, a catch-lever for holding said connections, a casing in which the catch-lever is pivoted, a swinging lever having an arm thereof projecting outside the casing and means for operating the said arm, and a detent for the catch-lever, said swinging lever being arranged to operate the detent, the said catch-lever, swinging lever and detent being pivoted within the casing, substantially as described.

7. In combination, the stop-motion head, tripping mechanism carried by the head including a swinging lever, a supplemental trip for operating the main trip and resetting means for the supplemental trip comprising a lever arranged within the head, substantially as described.

8. In combination, the stop-motion head, tripping mechanism carried by the head, a supplemental trip for operating the main trip and resetting means for the supplemental trip comprising the pivoted lever 30′ arranged within the head, substantially as described.

9. In combination in a stop-motion, tripping mechanism comprising a catch-lever 18 having a shoulder, means controlled thereby including the pin 21 carried by said means and held by said shoulder, a detent for said catch-lever, means controlling the detent, said catch-lever having a part to be engaged by the pin to be reset thereby, substantially as described.

10. In combination in a stop-motion head, the connections leading to the shipper devices, the catch-lever controlling said connections, a detent for holding the catch-lever, a swinging lever for operating the detent and a resetting-lever operated by the said connections for resetting the swinging lever, substantially as described.

11. In combination in a tripping mechanism for stop-motions, a detent, a lever controlled thereby, a member controlling the connections leading to the shipper devices and a shoulder on the lever arranged at an inclination to a radial line from the pivot of the lever along which line the said member is adapted to move approximately, substantially as described.

12. In combination in a tripping mechanism for stop-motions, a detent, a lever having a long arm bearing thereon and having an arm with a shoulder thereon comparatively close to its pivot, a member to engage said shoulder and arranged to move along a line substantially radial away from said pivot when released from the shoulder, connections leading to the shipper devices controlled by said member, the said shoulder being arranged at an inclination to the radial line from said pivot, substantially as described.

13. In combination, in a tripping mechanism for stop-motions, a swinging lever 14, connections controlled thereby and a resetting device for said lever moving along a path inclined to the longitudinal axis of the lever, substantially as described.

14. In combination, the swinging lever 14 of the trip mechanism, connections controlled thereby and a lever 30′ pivoted to one side of the swinging lever and having a part to reset the lever, said part moving in a direction longitudinally of the lever, substantially as described.

15. In combination in a tripping mechanism for stop-motions, a swinging lever 14, connections controlled thereby, said lever having a cam-surface thereon and a resetting-roller movable in a direction longitudinally of the lever to contact with said cam-surface, substantially as described.

16. In combination in a stop-motion, the rotary bobbin-stand, a stop-motion head car-

ried thereby, a series of pins carried by the stand and revolving therewith, means for controlling the position of the series of pins, said means being in turn controlled by the stop-motion head and connections to the shipper devices operated by the pins, substantially as described.

17. In combination with a knitting-head, shipper connections, a rotary bobbin-stand, stop-motion-controlling devices carried by the said stand, a standard supporting the stop-motion-controlling devices above the knitting-head and arranged axially in relation to said head and a connection from the stop-motion-controlling devices to the shipper connections comprising a rod arranged axially of and extending along the standard, the stop-motion-controlling devices also being arranged axially in relation to the standard, substantially as described.

18. In combination, the rotary bobbin-stand, stop-motion-controlling devices carried thereby, shipper connections and transmitting connections between the controlling devices and the shipper connections comprising the vertically-movable stem arranged axially in respect to the rotary bobbin-stand, substantially as described.

19. In combination, the rotary bobbin-stand, stop-motion-controlling devices carried thereby, shipper connections, a centrally-arranged tripper-foot vertically movable, and means for holding the foot normally up operated from said controlling devices, said tripper-foot when in its lower position serving to operate the shipper connections, substantially as described.

20. In combination, the rotary bobbin-stand, a standard extending up therefrom, the stop-motion-controlling devices, the shipper connections, the centrally-arranged tripper-foot having the pins guided in the bobbin-stand and having a hollow stem extending up around the standard, and means for normally holding said stem up operated by said controlling devices, substantially as described.

21. In combination, the stop-motion head, a standard supporting the same, a lever 23 pivoted beneath the stop-motion head under spring tension and controlled by the stop-motion devices, the vertically-movable connection extending along the supporting-standard of the stop-motion head, the catch for holding the same up controlled by the said lever 23, and means leading to the shipper devices controlled by the falling of the said connections, substantially as described.

22. In combination, the shipper connections, a rotary bobbin-stand comprising a standard, stop-motion-controlling devices supported by the standard and a hollow stem surrounding the standard, said stem being vertically movable controlled by the stop-motion devices at its upper end and controlling the shipper connections at its lower end, substantially as described.

23. In combination with a rotary knitting-head, a rotary bobbin-stand supported independently of the rotary parts of said head and above the same, means for rotating said stand and stop-motion devices carried by the stand, substantially as described.

24. In combination with a rotary knitting-head, a rotary bobbin-stand and a rotary stop-motion mechanism supported independently of and axially above the said head and means for rotating said stand and stop-motion mechanism, substantially as described.

25. In combination with a rotary knitting-head, a rotary bobbin-stand and a rotary stop-motion mechanism, means for supporting the stand and stop-motion mechanism independently of the head and above the same and means for driving the bobbin-stand and stop-motion mechanism from the rotary head, substantially as described.

26. In combination with a rotary knitting-head, a rotary bobbin-stand, stop-motion mechanism, means for supporting the stand and stop-motion mechanism independently of the head and a loose connection for driving the stand and stop-motion mechanism from the head, substantially as described.

27. In combination with a rotary knitting-head, a rotary bobbin-stand above the head, stop-motion mechanism, means for supporting the stand and stop-motion mechanism independently of the knitting-head, said supporting means having an opening through which the thread passes from the bobbins to the knitting-head, substantially as described.

28. In combination with the rotary head of a knitting-machine, a rotating stop-motion, means for supporting the same independently of the head, means for rotating the stop-motion and shipper connections operated by said stop-motion, substantially as described.

29. In combination, the rotary knitting-head, a rotary bobbin-stand and stop-motion mechanism above the same and a loose connection between the spindle of the knitting-head and the stand and stop-motion mechanism, substantially as described.

30. In combination, the rotary knitting-head, a ring-shaped support arranged concentric with the axis of the knitting-head and a bobbin-stand with stop-motion mechanism arranged to rotate on said ring-shaped support, substantially as described.

31. In combination, the rotary knitting-head, a support above the said head and a bobbin-stand having a ring resting on the said support to rotate, means for driving the bobbin-stand and stop-motion mechanism carried by the bobbin-stand, substantially as described.

32. In combination, the bobbin-stand supported to rotate, rotary stop-motion mechanism carried by the stand, the rotary knitting-head, and the pin-and-fork connection between the spindle of the knitting-head and the bobbin-stand, substantially as described.

33. In combination in a stop-motion, a sweep having an open-mouthed bent portion, to rest on the pivot-pin and having a tailpiece and a rod engaging the tailpiece, substantially as described.

34. In combination in a stop-motion, a sweep having an upwardly-bent portion leaving a downwardly-directed opening to receive the pivot, and a slotted block in which the sweep is pivoted, said block having a guard above the bent part of the sweep, substantially as described.

35. In combination, the sweep, the standard, the rods extending down alongside the standard, the transmitting connections controlled by said rods and springs for applying a tension to the rods and means for adjusting the tension of said springs independently, said means being carried by the standard, substantially as described.

36. In combination, a stop-motion head, a standard extending up therefrom, a sweep at the upper part of said standard, a feeler-finger supported on the head, tripping mechanism supported by the head, a detent for controlling the tripping mechanism and a sweep-rod extending down from the sweep, said sweep-rod and feeler being arranged to operate the detent directly and in the same direction, substantially as described.

37. In combination, the rotary stop-motion head, the feeler pivoted to fall opposite to the direction of rotation and a stop for holding the feeler against the influence of centrifugal force, substantially as described.

38. In combination, the rotary stop-motion head, the feeler pivoted to fall opposite to the direction of rotation and a stop for holding the feeler against the influence of centrifugal force, the guide, said stop being on the guide, substantially as described.

39. In combination in a stop-motion, a knot-catcher comprising the two plates arranged one over the other with a space between them and having slots diverging from the thread-gage whereby the mouths of said slots are located at different points along the edge of the said plates, the said thread-gage being formed at the junction of the slots, substantially as described.

40. In combination, the rotary bobbin-stand, stop-motion-controlling devices carried thereby, shipper connections, the vertically-movable connections leading from the controlling devices and the tripper-foot carried by the bobbin-stand, said tripper-foot being arranged concentric with the axis of rotation and having a plurality of pins disposed at different points about said axis, substantially as described.

41. In combination in a stop-motion, a main trip mechanism, means for controlling the same, a casing inclosing the said main trip mechanism and a resetting device within said casing, substantially as described.

42. In combination in a stop-motion, a casing, a catch-lever, a detent for holding said catch-lever, connections controlled by the catch-lever, a swinging lever and a resetting-lever, the said catch-lever, detent, swinging lever and resetting-lever all being pivoted within the casing, substantially as described.

43. In combination with a rotary knitting-head, stop-motion mechanism arranged above the head, supporting means for said stop-motion mechanism independent of the knitting-head, and means for driving the stop-motion mechanism from the head, substantially as described.

44. In combination with a knitting-head, a ring-shaped support above the same, a stop-motion mechanism supported on said ring-shaped support and a loose connection from the knitting-head to the stop-motion mechanism, substantially as described.

45. In combination with a rotary knitting-head, stop-motion mechanism arranged to rotate and supported independently of and axially above the said head and means for rotating the said mechanism, substantially as described.

46. In combination with a rotary knitting-head, a stop-motion, means for supporting the stop-motion independently of the knitting-head comprising a ring-shaped support above the said head and means for rotating the stop-motion, substantially as described.

47. In combination with a rotary knitting-head, stop-motion mechanism above the head including rotary parts, means for supporting the said rotary parts independently of the head and a loose connection for driving the rotary stop-motion parts from the head, substantially as described.

48. In combination, a rotary knitting-head, stop-motion-controlling devices above the same, a rotary support for said devices, means for sustaining the same independently of the rotary knitting-head, shipper connections and a connection leading thereto from the stop-motion-controlling devices arranged axially above the knitting-head, substantially as described.

49. In combination, a rotary bobbin-stand, rotary stop-motion means carried thereby, a loose connection from said rotary bobbin-stand to the knitting-head, and means for supporting the rotary bobbin-stand independently of the knitting-head, substantially as described.

50. In combination, the stop-motion head, an axial standard for supporting the same above the knitting-head and a connection leading from the stop-motion head consisting of the rod extending along the standard, both the standard and the rod being arranged axially in relation to the knitting-head, substantially as described.

51. In combination, stop-motion-controlling devices, a standard extending axially above the knitting-head and supporting the said

stop-motion devices and a connection leading from the stop-motion head and comprising a vertically-movable rod arranged axially of the knitting-head and extending longitudinally of the standard, substantially as described.

52. In combination, shipper connections, a rotary bobbin-stand, a standard, stop-motion-controlling devices at the upper end of the standard, and a vertically-movable rod controlled at its upper end by said devices and having a series of pins at its lower end to operate the shipper connections, said pins being disposed at points at equal radial distances from the standard and to drop into the plane of the shipper connections, substantially as described.

53. In combination in a rotary stop-motion, a pivoted feeler-finger and a guide having a stop to hold said finger against the action of centrifugal force, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK WILCOMB.

Witnesses:
CARRIE G. CORSON,
HAROLD CORSON.