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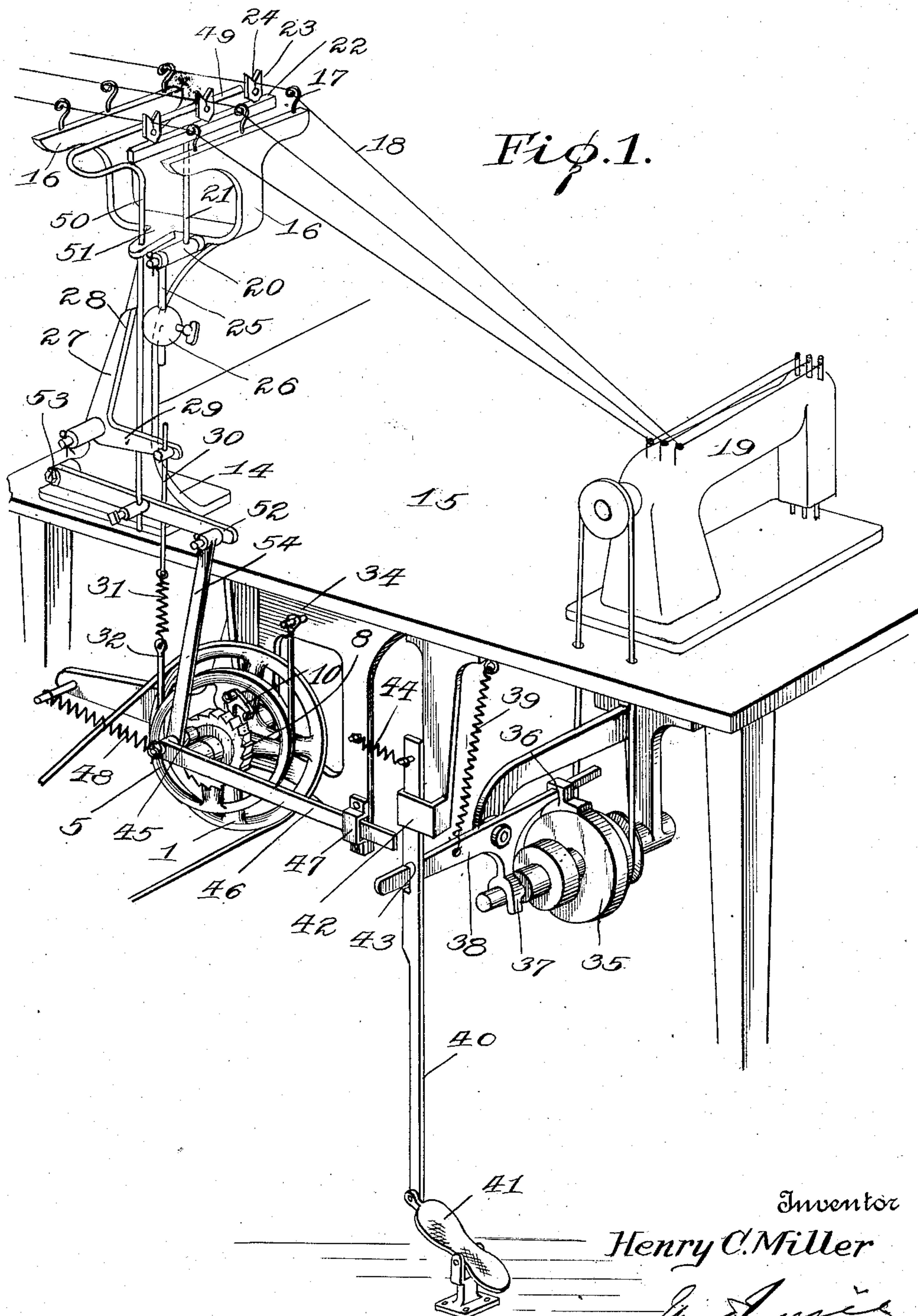
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1,777,804

POWER CONTROL MECHANISM

Filed July 26, 1922

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

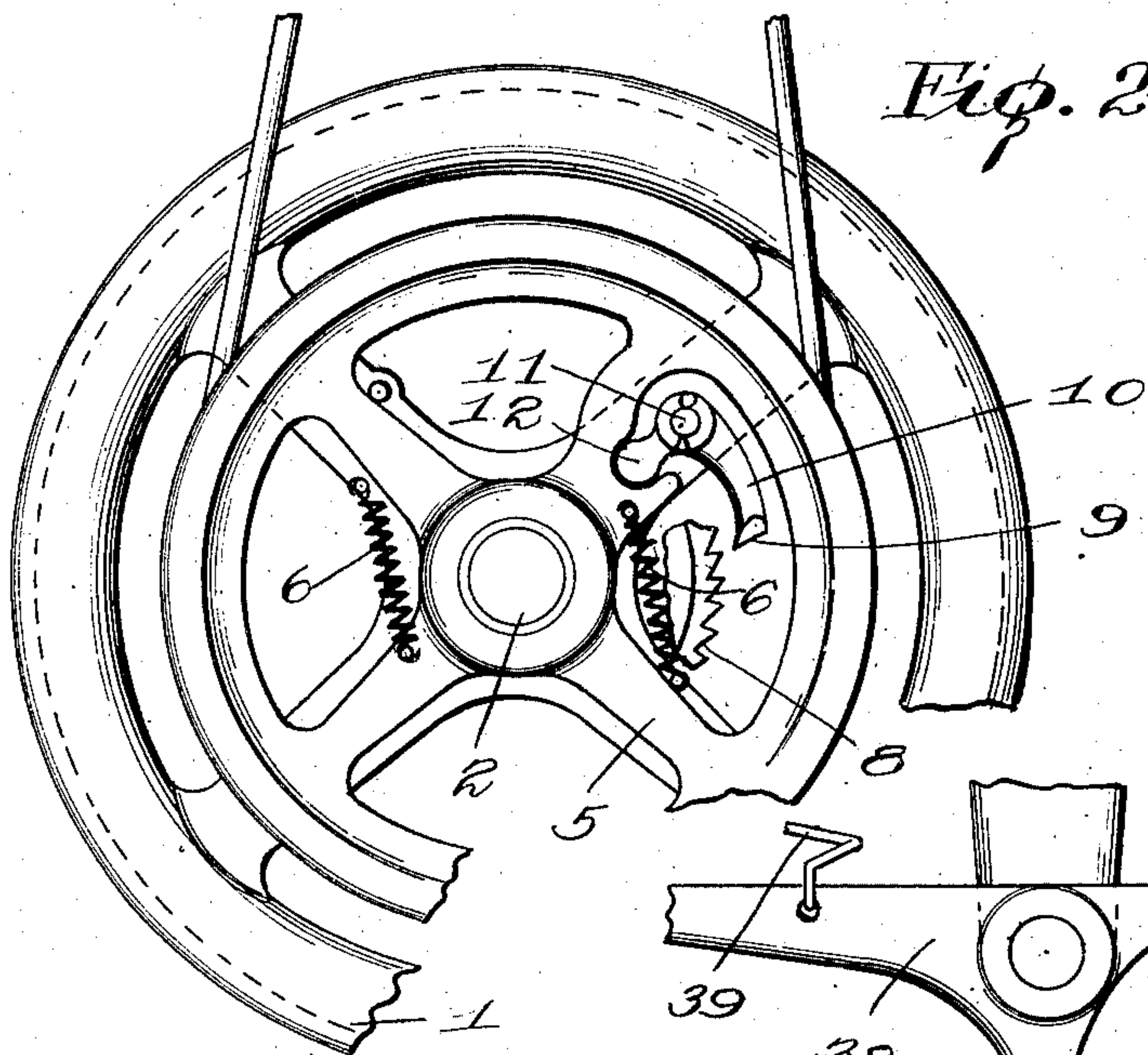


Fig. 2.

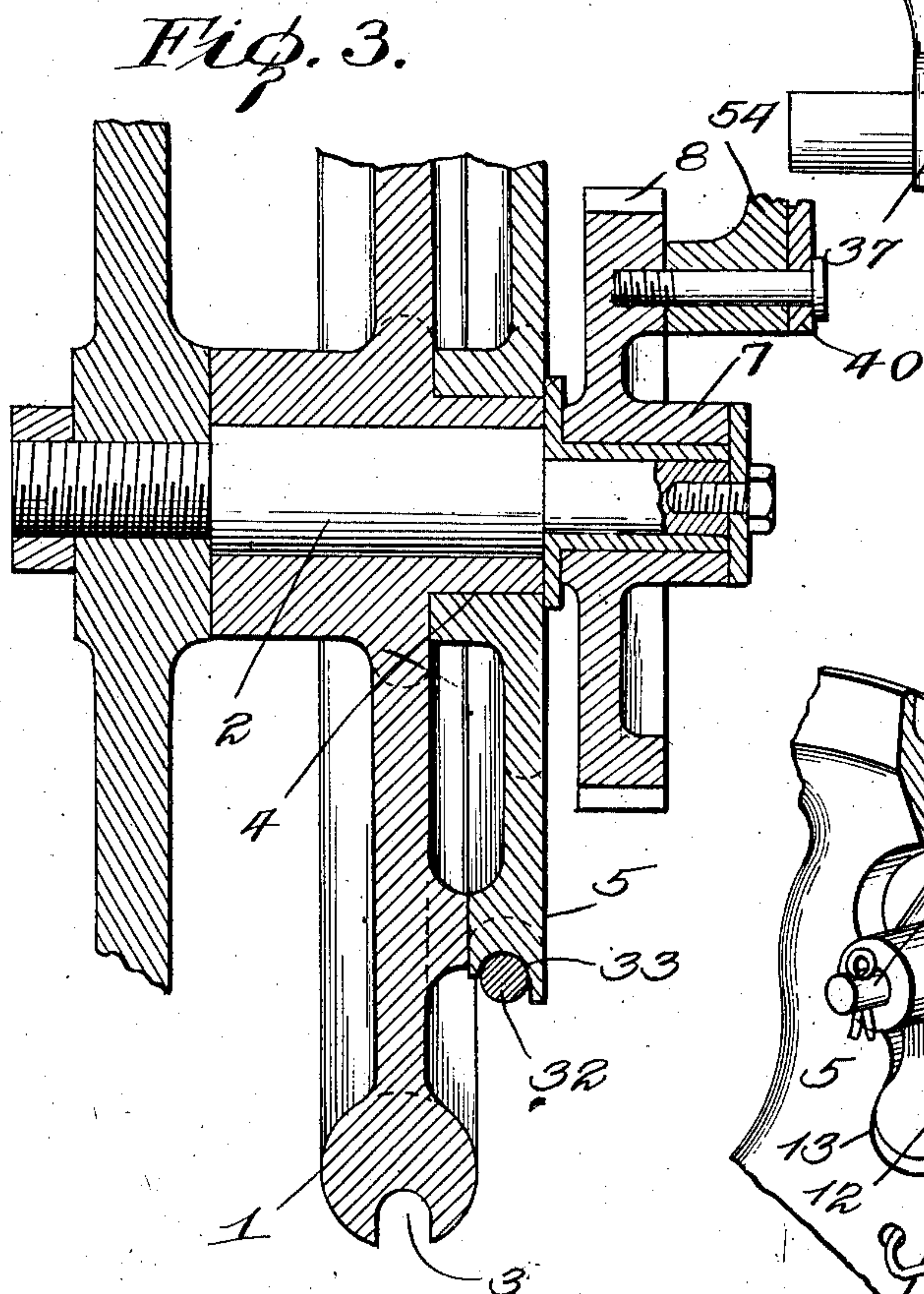


Fig. 3.

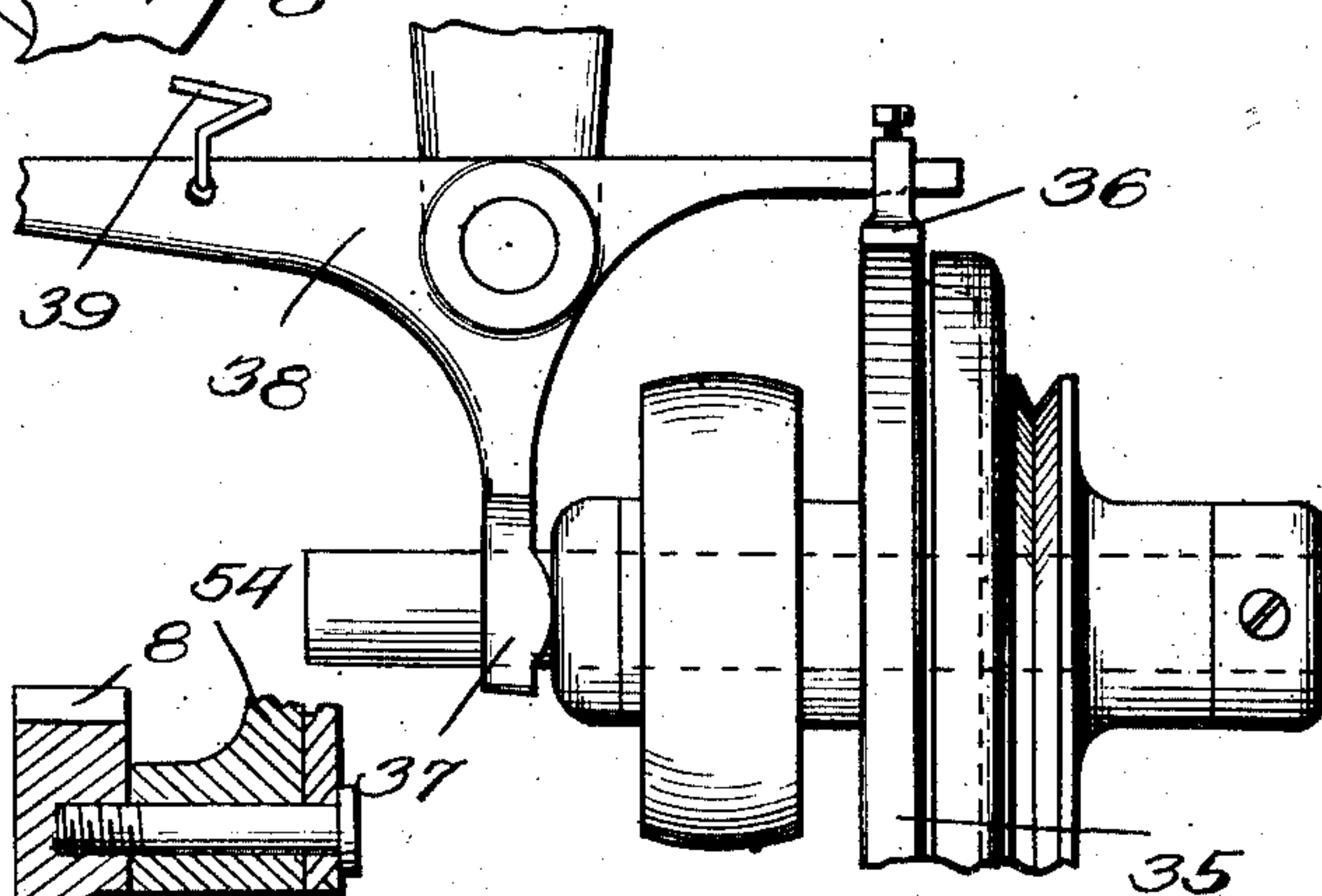


Fig. 4.

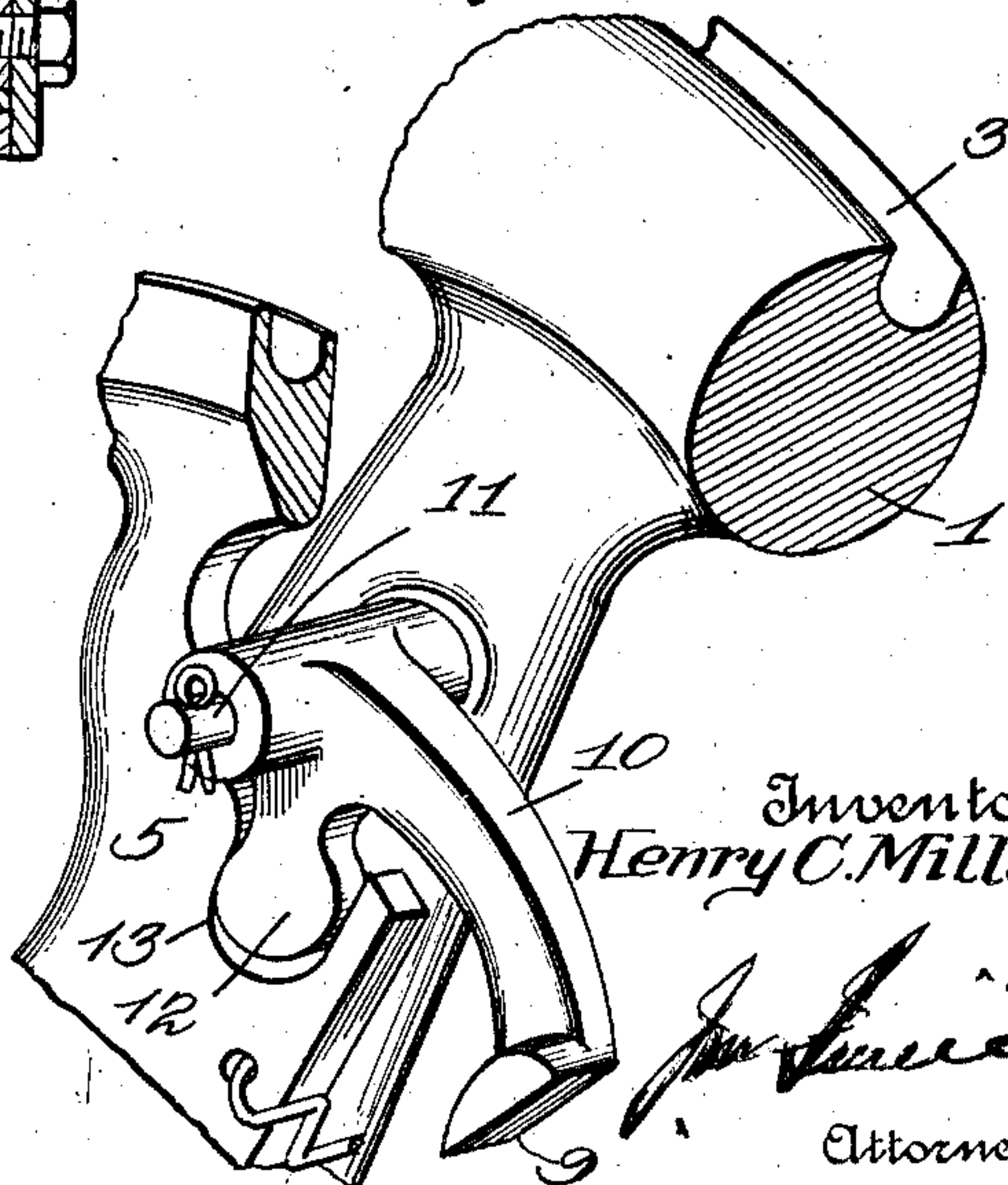


Fig. 5.

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## UNITED STATES PATENT OFFICE

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## POWER-CONTROL MECHANISM

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This invention relates to an improvement in power control means designed more or less particularly in connection with sewing machines and adapted under predetermined or unusual conditions of any part or parts of the sewing machine mechanism to utilize the power through which the machine proper is operated as a means for controlling the sewing machine mechanism or a specified part thereof.

In providing for the operation of a series of machines, as sewing machines, there is a continuously operated power shaft or mechanism from and by which the respective sewing machines are operated. As these sewing machines are individual, it is of course apparent that it is advisable to automatically control these individual machines without similarly affecting the other sewing machines.

The main object of the present invention therefore is the provision of an individual power control means set in motion or operation under a predetermined condition of the individual machine and operating as a result of that predetermined condition to control the mechanism, either starting or stopping the same of the particular machine.

The invention more specifically comprehends a continuously operated power driven element, with which is connected for a yielding rotative movement, what may be termed a trigger wheel. There is also mounted for co-axial rotation with the power wheel, an independent gear element, normally idle and in position to be engaged by a trigger carried by the power element. The trigger wheel is adapted through suitable sewing machine mechanism to be given a relative movement with respect to the power element, and the trigger carried by the power element is so mounted with relation to the trigger wheel that in this relative movement, the trigger is forced into engagement with the gear element. Thus the gear element is connected to and operated by the power element and the mechanism of the sewing machine to be controlled is operated directly as a result of the movement of this gear element.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view illustrating the application of the improvement to a sewing machine, the improved power control being here governed through a thread imperfection detector, and adapted in automatic operation to cut off the connection between the power and the sewing machine mechanism.

Fig. 2 is an enlarged broken elevation showing the power element and trigger wheel.

Fig. 3 is a vertical section through the control mechanism.

Fig. 4 is a broken perspective showing the trigger control movement through the relative movement of the trigger wheel and power element.

Fig. 5 is an elevation of the clutch and braking means of conventional type used with the mechanism.

The improved power control is here shown as involving a continuously operated power element, preferably in the form of a wheel 1, mounted upon a frame carried stub shaft 2 and driven from the continuously operated power shaft through a belt (not shown) co-operating with the belt groove 3 in the power wheel. Mounted for rotation upon a reduced hub portion 4 of the power wheel is what may be termed a trigger wheel 5. This trigger wheel is connected to the power wheel by springs 6, the construction providing for the ordinary rotation of the trigger wheel with the power wheel through the connection provided by such springs, the springs however permitting a relative movement between the power wheel and trigger wheel when necessary to set in operation the control mechanism, as will later appear.

Mounted upon a reduced portion of the stub shaft 2, is a gear wheel 7, the peripheral teeth 8 of which are positioned to be engaged by the nose 9 of a trigger 10 pivotally mounted upon a pin 11 projecting from one of the spokes of the power element 1. The trigger has an offset lug 12 adapted to seat in a recess 13 in the trigger wheel 5.

With direct reference to the power control mechanism, it will be apparent that the springs 6 are to be of sufficient tension to hold



the trigger wheel and power wheel in such rotative relation that the nose 9 of the trigger 10 will be held above or beyond the path of the teeth 8 of the gear wheel 7. If however, relative movement is produced between the power wheel and trigger wheel, as for example, by slightly retarding the movement of the trigger wheel, the walls of the slot 13 in said trigger wheel will depress the nose 9 of the pawl and cause the latter to engage the teeth of the gear wheel, whereupon the gear wheel will be in effect locked to the power element, and will be driven by the latter, through the trigger 10.

For convenience, and in order that the operation of the power control element might be made more plain through a specific application thereof, such power element is here shown as associated with a thread knot detector. While the present application will contain claims directed to this combination, it is nevertheless to be understood that the broad invention here involved is in the power control means, and that the use of this means is contemplated for various purposes in connection with sewing machines and similar mechanisms.

In the use of the power control means in connection with the thread detector, there is provided an upright 14 supported upon the bed plate 15 of the particular sewing machine and having spaced arms 16 at the upper end, from which project ordinary guides 17 for the threads 18 leading to the multiple thread sewing machine 19. A sleeve member 20 is pivotally supported upon the upright 14 and carries an upstanding rod 21 on the upper end of which is secured a transverse bar 22 having a plurality of upstanding thread guides 23. The guides 23 are formed with openings 24 to permit the passage of the thread therethrough so long as said thread is in normal condition, but in the event of a knot or other imperfection in the thread, these thread guides and therefore the sleeve 20 will be swung on their pivotal support. A rod 25 depends from the sleeve 20 and carries an adjustable weight 26, this weight being of course of a character to maintain the thread guides 23 normally upright and yet permit their swinging under the influence of a thread imperfection. An angle lever 27 is pivotally supported upon the upright 14 with the free arm 28 in the path of the weight 26. The opposite arm 29 of the lever is adjustably connected to a rod 30, which rod through a spring 31 is connected to a flexible connector or belt 32, which passes around the trigger wheel in a peripheral groove 33 therein with its opposite terminal connected to an eye member 34 secured to the bed plate 15.

Now in the event of a thread imperfection, the weighted rod 25 is moved to engage the free arm 28 of the lever 27. The opposite arm 29 of said lever is thereby elevated, tightening

the belt 32 about the trigger wheel and momentarily interfering with the free rotation of the trigger wheel and power element incident to the pull of the springs 6. This causes a sufficient relative movement between the power element and trigger wheel to trip the trigger 10 and cause said trigger to engage and thereby fix the gear wheel 8 for rotation with and directly by the power element.

This movement of the gear wheel is utilized in the previous arrangement to stop the machine, and to accomplish this result, there is shown conventionally at 35 a brake means 36 and a clutch means 37 mounted on a power driven shaft, whereby in the operation of the lever 38 connected to these means, the power to the machine 19 is cut off. A spring 39 normally influences the lever 38 in a direction to release the clutch and apply the brakes to cut off the power to the sewing machine. These details are all of ordinary type and of common usage in this art. A pedal bar 40 mounted for control by the operator through a pedal 41 is guided at its upper end in a frame guide 42 and provided with an offset or shoulder 43 to engage over the end of lever 38, a spring 44 normally maintaining this engagement. Thus the operator by suitably operating the pedal 41 may so control the lever 38 as to govern the application of power to the sewing machine 19 as in ordinary practice. The automatic control mechanism however, is adapted to govern this connection between the rod 40 and lever 38 to release the stop and start mechanism 35 for stopping operation without regard to control by the operator. For this purpose, the gear wheel 7 is provided with a stud 45, on which is supported a bar 46. This bar extends through a frame guide 47 with its free end in alignment with the bar 40. A spring 48 is connected to the stud 45 and to a fixed part of the frame structure.

With the described relative movement between the power element and trigger wheel, it is apparent that the gear wheel will be rotated to project the bar 46. The end of this bar engages the bar 40 and forces the same laterally to free the lever 38. The spring then thereupon releases the clutch and sets the brakes to stop power transmission to the machine 19. Of course the relative movement of the trigger wheel is momentary, but the subsequent engagement of the trigger and gear wheel under the influence of the power element maintains this connection for a portion of a revolution of the gear wheel, notwithstanding the momentary retardation of the trigger wheel and its immediate release from such retardation. When the gear wheel has reached a point where the spring 48 is acting reversely from the power element with respect to the cooperation of the gear of the trigger and gear teeth, the power strain on the trigger is relieved by the relatively op-



posite tendency of the gear wheel. Thus, the friction between the trigger and gear wheel is relieved, the springs act to move the trigger wheel to its normal position with respect to the power element, and the wall of the recess 13 immediately raises the trigger from cooperation with the gear wheel, and the parts are reset for normal further movement.

10 In connection with the specific application of the control mechanism here shown, it is desirable that the thread imperfection detector include means to avoid any strain or tension on the thread through the use of such detector. There is provided such means through  
15 a transverse bar 49, which underlies the threads immediately adjacent the thread detecting guides 23 and between said guides and the source of thread supply. This bar 49  
20 which is a bend or right angle of rod 50 passes through a guide 51 on the upright 14, the lower end of the rod being connected to a lever 52 pivotally supported at 53 on the upright and connected by a pitman 54 with the  
25 stud 45 of the gear wheel. Thus, immediately the power control is set in movement, the bar 49 is elevated and the threads raised from the thread guides 23. Thus, the imperfection, having served its purpose of stopping the machine 19, is permitted to pass  
30 onwardly for a short distance, and without being so retarded by the thread guide 23 as to cause any or very little strain or tension on the particular thread.

35 As previously stated, this invention is directed to a power control means, which through a predetermined condition of mechanism, may be automatically utilized for controlling the mechanism of sewing machines and similar apparatus. Its cooperation herein with a thread detector, while  
40 forming the subject matter of claims herein, is merely an incident of the use of such power control means, and it is to be expressly understood that the claims herein directed to the power control means per se are designed to protect such means in any and all uses to which it may be applied for the automatic control of power driven mechanism under  
50 predetermined conditions in such mechanism.

It will be understood that the sewing machine 19 is merely shown conventionally in order to indicate a complete apparatus. As operatively arranged, the sewing end of the  
55 arm of the machine would be substantially above the pedal 41 for the convenience of the operator, and the reversed and off set relation illustrated is merely with a view to avoiding a confusion in the drawing, which would  
60 result if the sewing machine were shown in its proper relation.

#### Claims:

1. In a control for power operated machines, a continuously operated power element, mechanism for operating the power op-

erated machine, a pawl adapted in operative position to connect the power element and such mechanism, means for moving said pawl to operative position, and means for automatically moving the pawl to inoperative  
70 position to disconnect said power element and mechanism, said last mentioned means serving to subsequently position the pawl in normal relation to the parts.

2. In a control for power operated machines, a toothed wheel, a pawl to cooperate therewith, one of said parts being continuously operated independently of the operation of the machine, the other of said parts being connected with mechanism for the operative control of said machine, means whereby said  
80 parts may be operatively connected, and means for automatically disconnecting said parts following a predetermined connected movement, said last mentioned means serving  
85 to thereafter position the parts in normal relation for subsequent action.

3. In a power control for sewing machines, a continuously driven power element, a normally free toothed element adjacent the  
90 power element, power governing means to be operated by said toothed element, a grooved element mounted adjacent the power element and having a yielding driving connection therewith, a member carried by the  
95 power element to be operated by the grooved element and adapted when operated to engage the toothed element to secure said power and toothed elements rotatively together, said member being held from engagement  
100 with the toothed element by the normal relation of the power element and grooved element, and means to operate the grooved element relative to the power element to cause said member to engage the toothed  
105 element.

4. In a power control for sewing machines, a continuously revolving power element, a frictionally governed element having a normal relation to the power element, friction  
110 means cooperating with said frictionally governed element to disturb the normal relation of said frictionally governed element and continuously revolving element, a power governing operating means arranged adjacent  
115 the continuously revolving element, and means to connect said continuously revolving element and said operating means when the frictionally governed element is controlled by said friction means.  
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5. In a power control for sewing machines, a continuously driven power element, a trigger wheel, means arranged for a limited retardation relative to the power element, a normally idle element adapted in operation  
125 to actuate machine connecting means, and a trigger carried by said power element and operated to engage said normally idle element when the trigger wheel is retarded relatively to the power wheel, and means for  
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applying resistance to said trigger wheel to retard said wheel relative to the power element.

6. A continuously driven power element, a normally idle element, connections between said idle element and sewing machine actuating mechanisms, frictional means, and connecting means carried by said power element to engage and operate the idle element following operation of said friction means, said connecting means automatically releasing the idle element following a predetermined movement of the latter, said connecting means being positioned for further operation with respect to the idle element following release of the idle element.

7. In a power control for sewing machines, a continuously revolving power element, a rotary trigger wheel, a normally idle element, connections whereby said idle element may govern the power to the sewing machine, means mounted on the power element to engage and operate the idle element when resistance is applied to the trigger wheel, said idle element operating said connections during the movement of such connections in resistance to the power element, said means releasing such idle element for movement to normal position immediately succeeding such resistance and within a cycle of movement of the idle element.

8. In a power control for sewing machines, a continuously-driven power element, a secondary power element operative to control the sewing machine operating mechanism, a trigger wheel having operating connection with the continuously driven power element but capable of independent relative movement, and means actuated in the relative movement of the trigger wheel element to connect the continuously-driven and secondary power elements to operate the latter in the movement of the former and thereby govern the sewing machine operating mechanism, said connecting means maintaining the connection between such power elements during working movement of the secondary power element and being automatically operated to disconnect said power elements immediately following such working movement.

9. The combination with a thread imperfection detecting mechanism of a power control means for stopping the operation of the machine in the actuation of the thread detector, said power control means including a power driven element, a normally idle element, a connection between said element and stop and start mechanism for the machine, a frictionally governed element normally operative with the power element and adapted for a yielding relative movement thereto under friction restraining means, means operated by the frictionally governed means when frictionally restrained to connect the

power element and idle element for simultaneous movement, and means operated in the actuation of the thread detector to frictionally restrain the frictionally governed element.

10. A power control means for sewing machines, including a continuously operated power element, an idle gear element, stop and start mechanism, connections whereby movement of said idle gear element will automatically control the stop and start mechanism, a trigger carried by the power element and adapted when in operative position to engage the idle element to operate the latter by the power element, a trigger wheel having a yielding connection with the power wheel and adapted to normally rotate therewith, means on said wheel to operate the trigger to engage the idle gear element when said wheel is moved relatively to the power wheel, a friction means adapted when under tension to normally retard the trigger wheel with respect to the power element for the actuation of the trigger, a thread imperfection detector including a member mounted for swinging movement through engagement of an imperfection in the moving thread, a lever operated by said swinging movement, and a connection between said lever and friction means to retard the trigger wheel in the operation of the lever.

11. A power control means for sewing machines, including a continuously operated power element, an idle gear element, stop and start mechanism, connections whereby movement of said idle gear element will automatically control the stop and start mechanism, a trigger carried by the power element and adapted when in operative position to engage the idle element to operate the latter by the power element, a trigger wheel having a yielding connection with the power wheel and adapted to normally rotate therewith, means on said trigger wheel to operate the trigger to engage the idle gear element when said trigger wheel is moved relatively to the power wheel, a friction means adapted when put under resistance to normally retard the trigger wheel with respect to the power element for the actuation of the trigger, a thread imperfection detector including a member mounted for swinging movement through engagement of an imperfection in the moving thread, a lever operated by said swinging movement, a connection between said lever and friction means to retard the trigger wheel in the operation of the lever, an automatic means to cause the release of the defect in the thread from its contact with the detector immediately following the swinging movement thereof under a thread imperfection.

12. In a thread imperfection detector, a continual power driven element, a normally



disconnected element adapted to coact with the power driven element, a thread using machine adapted to be manually thrown in and out of power, means for causing a defect in the thread to compel a movement in the detector, and means whereby the said detector movement causes a connection to be made between the power driven element and the normally disconnected element to disconnect the manual control element from the control of the operator.

13. In a thread imperfection detector, a continual power driven element, a normally disconnected element adapted to cooperate with the power driven element, a manually controlled means adapted to start and stop the thread using means without correspondingly affecting the continual power driven element, means whereby a defect in the thread causes a thread detector movement, and means whereby said thread detector movement causes a connection to be made between the power driven element and the normally disconnected element to cause the latter to disconnect the thread using means from its power drive irrespective of the intent of the operator.

14. A stop mechanism for thread using machines controlled by a thread defect and comprising a power driven element for the machine a separate power driven element, a stop mechanism for the machine, and means controlled by a thread defect to utilize said separate power element to release the stop mechanism for actuation.

15. In an automatic stop mechanism of a thread using machine, a separate power driven element, a stop element, a manually operable member to hold the stop element from actuation, and means controlled by a thread defect and operated by the separate power element to disconnect the stop mechanism from the manually operable means.

16. In a thread using machine, a stop member, a separate continuously operated power element, manually operable starting means, a connector between said starting means and stop element to hold the stop element in release position in the actuation of the starting means, and mechanism operated by a thread defect to cause the separate continuously operated power element to withdraw the connector from cooperation with the stop means.

17. In a thread using machine, a stop member, a separate continuously operated power element, manually operable starting means, a connector between said starting means and stop element to hold the stop element in release position in the actuation of the starting means, and mechanism operated by a thread defect to cause the separate continuously operated power element to withdraw the connector from cooperation with the stop means, and a spring for actuating the stop means on withdrawal of said connector.

18. A stop mechanism for thread using machines, controlled by a thread defect, and comprising a separate continuously driven power element, a stop mechanism for the machine, and means controlled by a thread defect to cause said power element to actuate the stop mechanism, to thereby cause said stop mechanism to stop the machine.

19. In a thread using machine, a stop member, manual starting means, a connection for normally connecting the stop member and manual starting means, a separate continuously driven power element, and means controlled by a thread defect to cause the separate continuously driven power element to operate said connection for the release of the stop member.

20. A stop mechanism for thread using machines, comprising a separate continuously driven power element, means controlling the starting and stopping of the machine, a manually operable device connected to actuate said means for starting the machine, and mechanism actuated by the separate continuously driven power element and controlled by a thread defect to disconnect the manually operable device from said means, whereby to free the means for stopping movement.

21. In an automatic thread defect stopping mechanism, a separate continuously operated power driven element, a power driven thread using mechanism, means for manually connecting the thread using mechanism for power operation thereof, and means controlled by a thread defect and actuated by the separate continuously operated power driven element for disconnecting the manual means in its power control of the thread using mechanism, whereby the thread using mechanism is free of the manual control.

22. A thread using machine, a start and stop mechanism therefor, a separate continuously driven power element, manually operable means for said mechanism to actuate the same for starting said machine, means for actuating said mechanism when released from said manually operable means for stopping the machine, and means controlled by a thread defect to cause the separate continuously driven power element to release the start and stop mechanism for machine stopping movement.

23. In a thread using machine, a stop mechanism, a separate continuously driven power element, a thread guide operable under thread imperfection, a trip mechanism actuated in the operation of the thread guide, and means controlled by the trip mechanism to cause the separate continuously driven power element to release the stop mechanism for operation.

24. In a thread using machine, a stop motion, a manually operable element to control the stop motion, a thread guide operable under thread imperfection, a trip mechanism



actuated in the operation of the thread guide, a separate continuously driven power element, and means controlled by the trip mechanism to utilize the separate continuously driven element to release the stop motion from the manual control.

25. In a thread using machine, a stop motion, a separate continuously driven power element, manually operable means to actuate the stop motion to start the machine, means to cause said stop motion to become effective when released from the manually operable means, a thread guide operable through thread imperfection, and a trip mechanism normally set for operation and released for operation in the movement of the thread guide, said trip mechanism utilizing the separate continuously driven power element to release the stop motion from the manually operable means.

26. In a thread using machine, a stop motion, a separate continuously driven power element, a manually operable means for controlling the stop motion, release mechanism designed for actuation by the separate continuously driven power element to release the stop motion control by the manually operable means and means actuated by a thread imperfection to position the release mechanism for actuation by the separate continuously driven power element.

27. In a thread using machine, including a stop motion, a power driven element manually operable means for controlling said stop motion, a stop motion release including a pawl to engage the power driven element for actuation of said release, means for automatically disengaging the pawl following a predetermined movement of said release, a thread guide movable under thread imperfection, and means released by the operation of the thread guide to actuate the stop motion release.

28. In a thread using machine, a stop motion, a manually operable element, an interlocking bar normally connecting the manually operable element and stop motion, a separate continuously driven power element, a thread guide operable by thread imperfection, a trip mechanism released in the movement of the thread guide, and means operated by the trip mechanism to cause the separate continuously driven power element to actuate the interlocking bar to release the stop motion from the manually operable element.

29. In a thread using machine, a stop motion, a manually operable element, an interlocking bar normally connecting the manually operable element and stop motion, a separate continuously driven power element, a thread guide operable by thread imperfection, a trip mechanism released in the movement of the thread guide, and means operated by the trip mechanism to cause the separate continuously driven power element to

actuate the interlocking bar to release the stop motion from the manually operable element, said interlocking bar being released from the separate continuously driven power element following a predetermined movement thereof.

30. A power control means for machines, including a power wheel operated continuously independently of the operation of the machine, a member acting when operated to control the operation of the machine, an element for operating said member, and casually operated means whereby the element may be connected to and operated by the power wheel, said casually operated means including a trigger wheel normally operated by and with the power wheel, a casually operated device to govern the trigger wheel, and means responsive to the movement of the trigger wheel under the control of the casually operated device to connect the power wheel and element and thereby compel operation of said member for the government of the operation of the machine, said last named means being normally inactive and being automatically restored to normal position following a limited operation.

31. A power control means for machines, including a power wheel operated continuously independently of the operation of the machine, machine control mechanism, a member acting when operated to govern said control mechanism, a normally idle element serving when actuated to operate the member, and casually operated means for actuating said normally idle element, said casually operated means including a trigger wheel normally actuated by and with the power wheel, a casually operated device for governing the movement of the trigger wheel independently of the power wheel, and means carried by the power wheel and operative by the trigger wheel under the influence of the casually operated device to connect the power wheel and normally idle element and thereby compel operation of said member to govern said control mechanism, said last named means being normally free of cooperation with the idle element and being automatically restored to such normally free position following a limited active cooperation thereof with the normally idle element.

In testimony whereof I affix my signature.  
HENRY C. MILLER.

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