

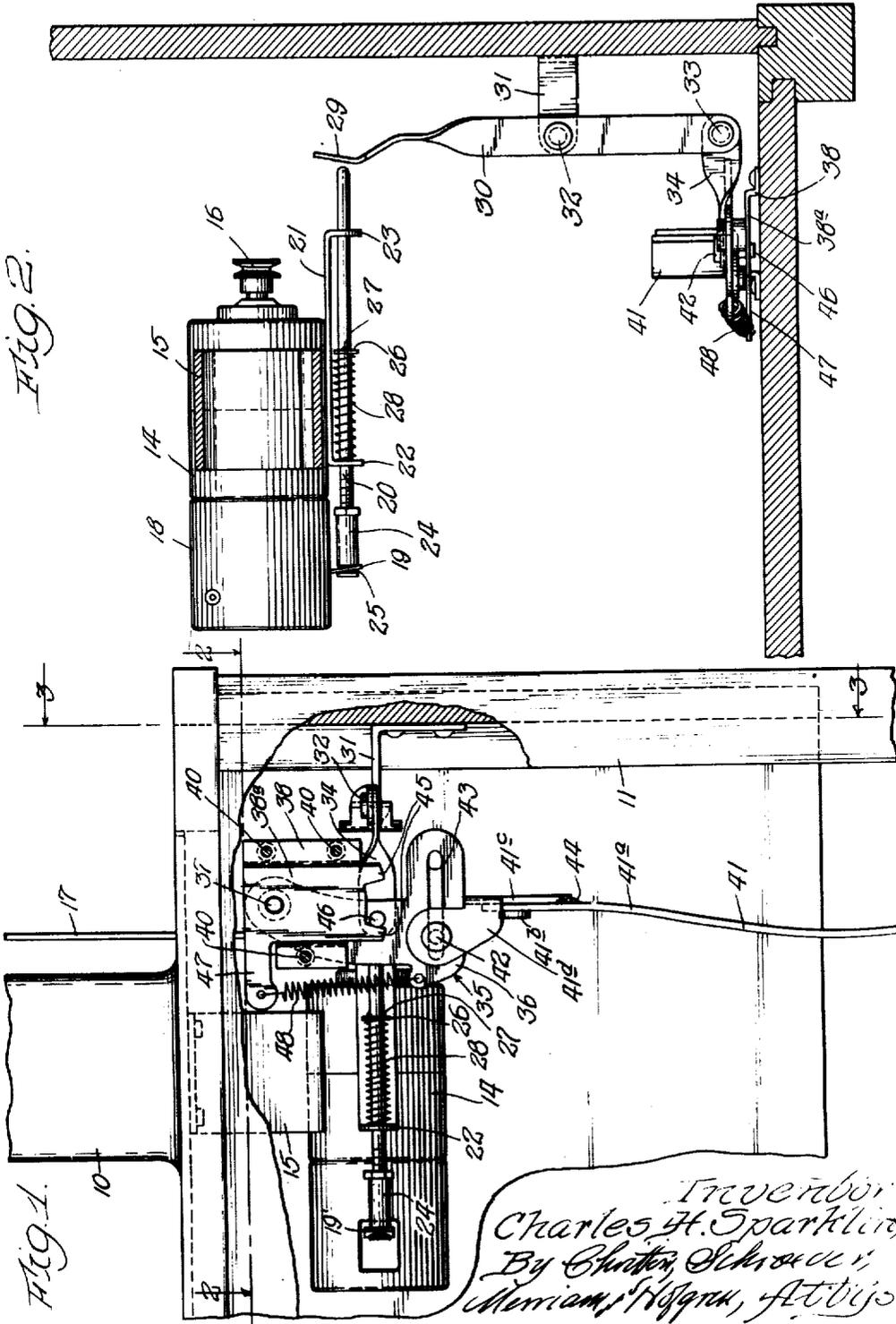
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SPEED CONTROL FOR MOTORS

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2 Sheets-Sheet 1



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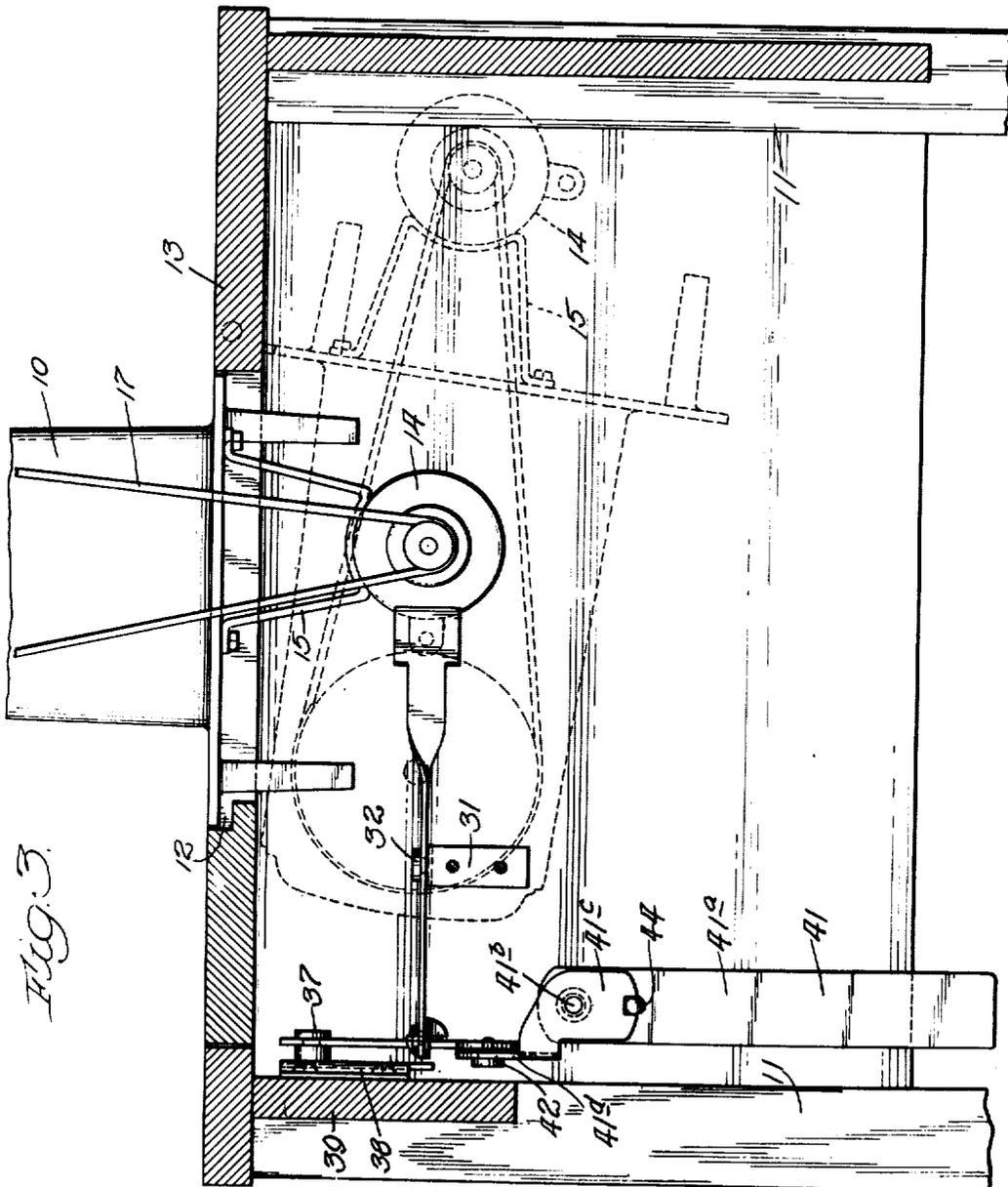


Fig. 3.

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SPEED CONTROL FOR MOTORS

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8 Claims. (Cl. 74—515)

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This invention relates to a speed control for a motor wherein the motor speed is determined by the relative positions of a speed control member, and particularly relates to such a speed control that is especially adaptable for use on a sewing machine motor.

This invention is an improvement over that shown in my copending application Serial No. 606,076, filed July 20, 1945, now Patent No. 2,516,156.

In the ordinary electric sewing machine, the machine is driven by a motor mounted adjacent the sewing machine head with the power being transmitted through a belt or similar means extending between the motor and the machine head. Many electric machines are of the drop head type wherein the head may be lowered from a raised or operating position to a storage or non-operating position. In this latter position, the machine head is ordinarily beneath the top of a table upon which the sewing machine is mounted. Where the motor is provided with speed control apparatus for controlling the operation of the sewing machine, it has previously been necessary that the control means be movable with the motor and the sewing machine head. It has been discovered, however, that better control of the machine can be obtained if means are provided for controlling the speed by the knee of the operator. With this knee control, it is difficult to provide an apparatus for controlling the speed in a drop head machine as ordinarily it would be expected that the entire control apparatus must be movable with the machine head.

I have invented a speed control apparatus wherein the main control portion is fixedly mounted on the table or other structure supporting the sewing machine with this fixed portion of the apparatus being engageable with a second portion of the apparatus only when the sewing machine head has been raised to an operating position. The remainder of the control apparatus is mounted for movement with the sewing machine head and is in operative position only when the machine head itself is in operative position. The apparatus of this invention permits very close control over the speed of the sewing machine motor and is operated by the knee of the operator so that the hands may remain free. It is of relatively simple construction and will require only a minimum of care and upkeep.

The invention will be described as related to the embodiment shown in the accompanying drawings. Of the drawings:

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Fig. 1 is a front elevation of the apparatus of this invention with portions of the table support broken away; Fig. 2 is a horizontal section taken along line 2—2 of Fig. 1; and Fig. 3 is a vertical section taken along line 3—3 of Fig. 1.

The motor speed control shown in the accompanying drawings may be used on any electric motor, but is particularly useful on those motors that are movable into and out of operating position, such as the motor for a sewing machine. In the embodiment shown, the sewing machine head 10 is mounted on a table 11. The sewing machine is located on a platform 12 that is rotatable so that the sewing machine head may be lowered to a position beneath the top surface 13 of the table as shown in dotted lines in Fig. 3. The motor 14 for driving the sewing machine is located on the bottom of the platform 12 by means of a bracket 15. The motor is provided with a pulley 16 for driving the belt 17, which in turn drives the sewing machine. As shown in Fig. 3, the sewing machine head 10, motor 14, and belt 17 are movable into and out of position as a unit.

The motor 14 has mounted on the rear end a housing 18 which houses the speed control mechanism. Extending from one side of the housing 18, there is located a speed control member 19 with the speed of the motor being determined by relative positions of this speed control member. As shown in Fig. 1, the speed control member 19 is in off position and rotation is begun and increased by moving the member 19 to the left. Such a construction is shown and described in greater detail in my copending application Serial No. 606,076, filed July 20, 1945.

The speed control member 19 is operatively connected to an arm 20 held in substantially horizontal position by means of a bracket 21 attached to the side of the motor 14. The bracket 21 has a pair of outwardly extending parallel flanges 22 and 23 with the arm 20 being slidably held in holes in the flanges. The end of the arm 20 adjacent the speed control member 19 is provided with screw threads engaging and holding a similarly threaded thimble 24. The opposite end of the thimble is provided with an annular groove 25 for holding the yoke shaped end of the speed control member 19. With this construction, the effective length of the arm 20 may be changed by turning the thimble 24 relative to the arm 20. The arm 20 is provided with an annular collar 26 between the two flanges 22 and 23. This collar is held in place by means of spaced pinched-up portions 27 of metal. The collar 26 is so located

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that a compression spring 28 between the first flange 22 and the collar 26 will hold the speed control member 19 in a retracted position as shown in the drawings.

Directly opposite the free end of the arm 20, when the sewing machine is in raised or operating position, there is located one end 29 of a rotatably mounted bar 30. This bar is arranged at substantially right angles to the axis of the arm 20 and is rotatably mounted on a bracket 31 intermediate the ends of the bar for rotation in a substantially horizontal plane. The bar 30, as shown, is made of a flat strip of metal with the end 29 adjacent the arm 20 being formed by twisting the strip approximately 90 degrees. The end 29 of the strip is flared outwardly.

In order to impart movement to the bar 30 around its fulcrum 32, the other end 33 of the bar is rotatably attached to a second short strip 34. This short strip 34 is twisted approximately 90 degrees and has its other end attached to a lever 35. The lever 35 comprises an elongated plate 36 fulcrumed at its top end by means of a stud 37 attached to a fixed plate 38 mounted on the inner surface of the front top wall 39 of the table by means of screws 40. The main body portion 38a of the plate 38 is spaced from the inner surface of the wall 39, as shown in Fig. 2. At the bottom of the movable elongated plate 36, there is attached a downwardly extending lever arm 41. This lever arm 41 has a bottom extended portion 41a attached by means of a screw bolt 41b to a joiner plate 41c. The plate 41c is provided with an upwardly extending ear 41d. This ear is held by means of a screw bolt 42 in a horizontal slot 43 at the bottom of the movable elongated plate 36. With this construction the lever arm 41 may be located any where along the slot 43. The bottom extended portion 41a is held against rotation relative to the plate 41c by a raised section 44 engaging the plate 41c.

A tension spring 48 is provided extending between an arm 47 on the fixed plate 38 and a portion of the movable elongated plate 36. This spring serves to hold the apparatus in a retracted position.

In order to provide for limiting the movement of the lever structure 35, the fixed plate 38 is provided with two downwardly extending spaced ears 45. The stud 46, which fastens the end of the short strip 34 to the movable elongated plate 36 is provided with an extended portion located between the ears 45. When this extended portion of stud 46 is in abutting relationship with one of the ears, as shown in Fig. 1, the apparatus is at a position corresponding to an off position of the motor. When the extended portion is moved so that it is in abutting relationship with the other ear, the apparatus is in a position corresponding to the highest speed of the motor. With this construction, the speed control apparatus is limited in movement and there is no danger that it will be moved to an extreme position where the apparatus might be harmed.

The arm 20 which is connected to the speed control member 19 lies substantially transverse to the plane of movement of the sewing machine head 10 and the motor 14. As the outer end of the arm 20 is spaced from the corresponding end of the bar 30, the sewing machine motor and speed governor may be moved into and out of operating position without having the arm 20 contact the extended end 29 of the bar 30. When the sewing machine is in operating position, the end 29 of the bar 30 is opposite the free end of the arm 20.

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When in this position, the speed of the motor may be controlled by the operator pressing his knee against the lever arm 41. Pressure on the lever arm causes the free end of the bar 30 to move to the left as shown in Fig. 2 and bear against the end of the arm 20. As pressure on the lever arm 41 is increased, the speed control member 19 is moved farther to the left. This speeds up the motor. As pressure on the lever arm is released, the springs 28 and 48 cause the apparatus to move toward a retracted position and thus move the speed control member 19 to the right or to a position corresponding to a lower speed. With this operation, very close control of the speed can be provided. When the apparatus is at rest, as shown in the drawings, the sewing machine head may be dropped to a non-operating position beneath the top surface 13 of the table as is shown by the dotted lines in Fig. 3.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that this invention be not limited by any of the details of description but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. In a speed control for a sewing machine motor or the like wherein the motor is movable into and out of operating position, and wherein the motor speed is determined by the relative positions of a speed control member attached to and movable with the motor, positioning means comprising an arm operatively connected to said speed control member and mounted on the motor, said arm extending transversely to the plane of movement of the motor, a pivotally mounted second arm located substantially parallel to the plane of movement of the motor and at one side of the path of movement of the motor, said second arm having one end adjacent the free end of the first arm only when the motor is in operating position, means for moving said second arm into contact with said first arm when the motor is in operative position to cause movement of the first arm, means operatively connected to the first arm for urging it into a retracted position, and means operatively connected to the second arm for urging it into a retracted position.

2. In a speed control for a sewing machine motor or the like wherein the motor is movable into and out of operating position, and wherein the motor speed is determined by the relative positions of a speed control member attached to and movable with the motor, positioning means comprising an arm operatively connected to said speed control member and mounted on the motor, said arm extending transversely to the plane of movement of the motor, a pivotally mounted second arm located substantially parallel to the plane of movement of the motor and at one side thereof, said arm having one end adjacent the free end of the first arm only when the motor is in operating position, a lever operatively connected to the other end of said second arm beyond its pivot point for moving the second arm around its pivot, said lever comprising a plate member pivoted at one end with a lever arm attached to the other end and with the second arm being operatively connected to said plate member, at a point between said ends spring means on said first arm normally urging said arm to a retracted position, and spring means on said plate member normally urging the lever and second arm to retracted positions.

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3. The positioning means of claim 2 wherein means are provided for attaching the lever arm to the plate member at a plurality of lateral positions.

4. In a speed control for a sewing machine motor and the like wherein the motor is movable into and out of position and the speed of the motor is determined by the relative position of a speed control member carried by the motor, positioning means for said speed control member comprising a member operatively attached to said speed control member at all positions of the motor, and a lever means arranged at one side of the path of movement of the motor and positioned to contact said attached member for causing movement thereof only when the motor is in operating position.

5. In a speed control for a motor wherein the motor speed is determined by the relative positions of a speed control member, positioning means for said member comprising an arm operatively connected to said member, a second arm pivotally mounted with one end adjacent to but normally spaced from the free end of said first arm, a plate member pivotally mounted at one end and operatively connected to the end of the second arm that is opposite the first arm, a lever removably attached to said plate member at the end opposite the pivotally mounted end and beyond the connection of the plate member to the second arm, and means for attaching said lever to said plate member at any point in a line extending generally transversely to the line determined by the pivoted mounting of the plate member and the point of connection of the plate member to the second arm.

6. The positioning means of claim 5 wherein said attaching means comprises a transverse slot in the plate member.

7. In a speed control for a sewing machine or the like wherein the motor is mounted on a base member for arcuate movement into and out of operating position, and wherein the motor speed is determined by the relative positions of a speed control member attached to and movable with the motor, positioning means comprising an arm operatively connected to said speed control member and mounted on the motor, said arm extending transversely to the plane of movement

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of the motor and being movable longitudinally to vary the position of the speed control member, a pivotally mounted second arm located substantially parallel to the plane of movement of the motor and at one side of the path of movement of the motor, said arm having one end adjacent the free end of the first arm but normally out of contact therewith when the motor is in operating position, a link member pivotally attached to the end of the second arm that is opposite the motor and extending substantially parallel to the first arm, a plate member pivotally mounted at one end to which the end of the link member that is opposite the second arm is rotatably attached, said plate member lying substantially at right angles to the plane determined by said second arm and link member and substantially parallel to said link member, a lever arm attached to said plate member at a point beyond the point of attachment of the link member to the plate member, said lever arm lying substantially in the plane of the plate member, means for urging the first arm to a retracted position, and means for urging said second arm, link member and plate member to retracted positions.

8. The positioning means of claim 7 wherein said plate member is provided with a slot at the point of attachment of the lever arm to the plate member, said slot lying substantially transversely to a line determined by the pivotal mounting of the plate member and the point of attachment of the link member to the plate member and said lever arm being provided with a portion engaging said slot for attaching the lever arm to the plate member.

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