Mar. 27, 1923. 1,449,828

D. S. MAIMIN ET AL

CONTROLLING SEWING MACHINE MOTORS

Filed Feb. 9, 1920 2 sheets-sheet 1

Fig. 1,

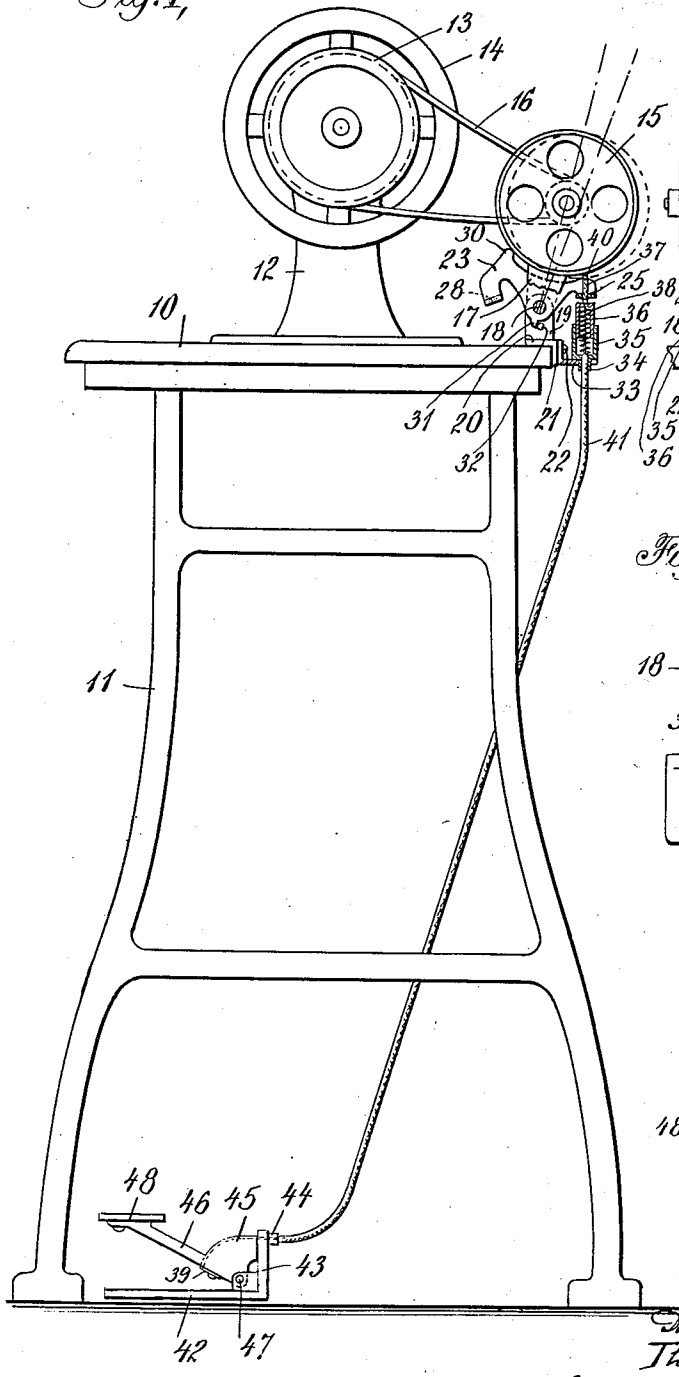


Fig. 2,

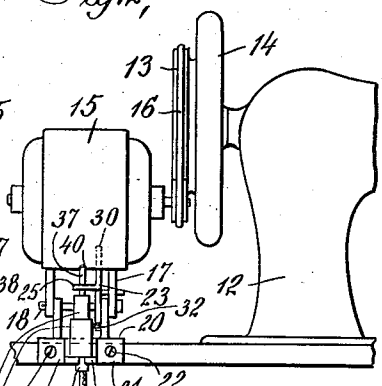


Fig. 3,

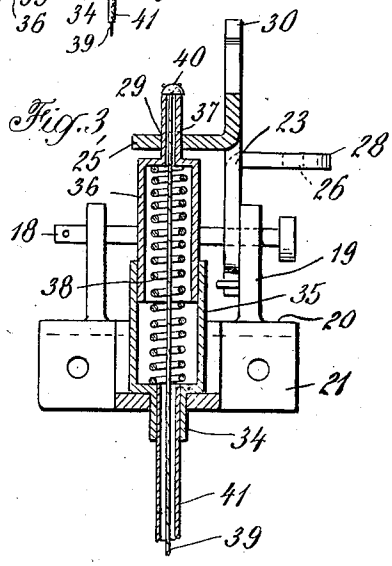
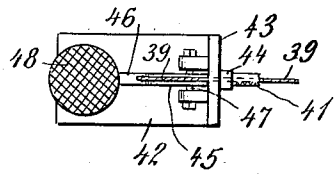


Fig. 4,



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Fig. 5,

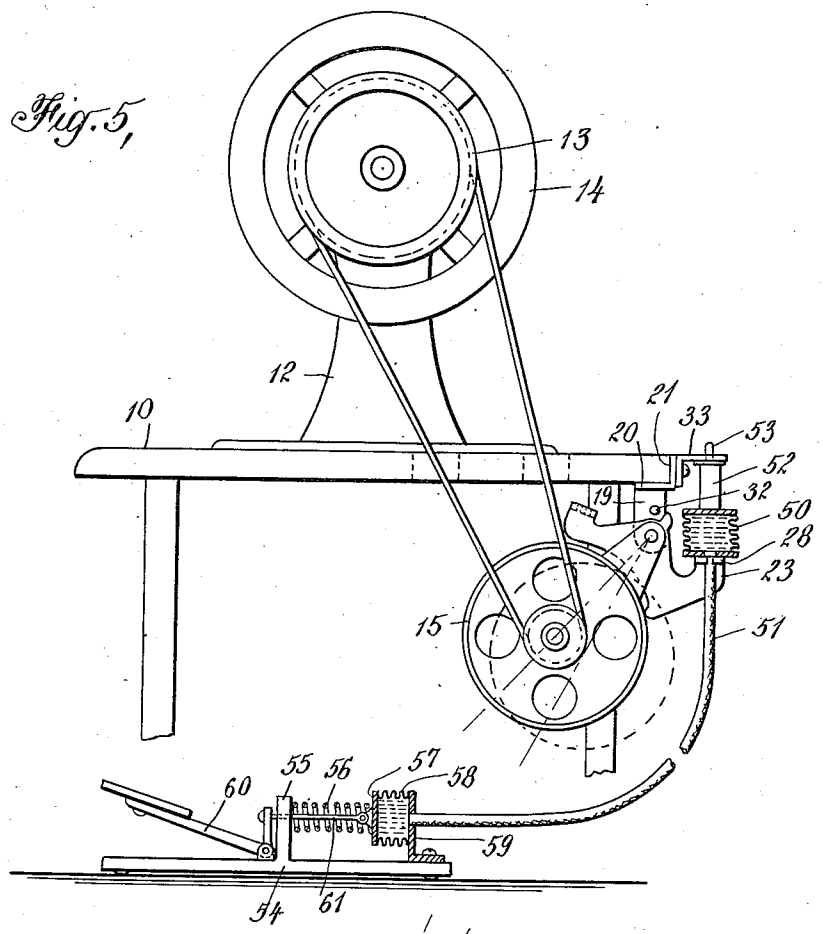


Fig. 6,

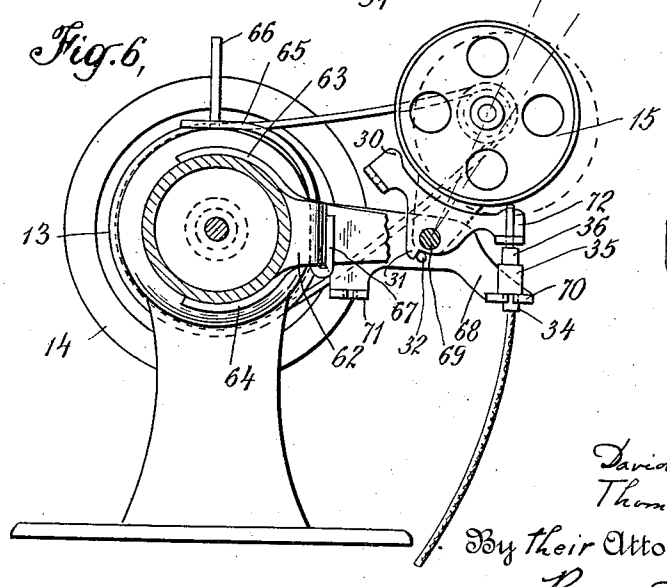
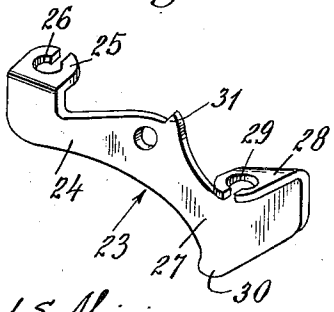


Fig. 7.



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Patented Mar. 27, 1923. 1,449,828

UNITED STATES PATENT OFFICE.

DAVID S. MAIMIN, OF NEW YORK, N. Y., AND THOMAS VEITCH, OF ENGLEWOOD, NEW JERSEY, ASSIGNORS TO H. MAIMIN COMPANY, INC., A CORPORATION OF NEW YORK.

CONTROLLING SEWING-MACHINE MOTORS.

Application filed February 9, 1920, Serial No. 357,254. Renewed September 2, 1922. Serial No. 586,021.

To all whom it may concern:

Be it known that we, DAVID S. MAIMIN and THOMAS VEITCH, both citizens of the United States, and residing, respectively, at New York city, county and State of New York, and Englewood, county of Bergen, and State of New Jersey, have invented certain new and useful Improvements in Controlling Sewing-Machine Motors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in controlling sewing machine motors and is particularly adapted for use in connection with motors which are mounted to swing about axes adjacent to the wheels of sewing machines and be held in operative relation to the wheels of the machines by their own weight, whenever it is desired that the machines be driven, but which may be taken out of such relation whenever it is desired to stop the machines. Power may be transmitted from the motors to the machines by means of friction pulleys on the shafts of the motors which are brought into engagement with the hand wheels by allowing the motors to fall toward the machines; or pulleys on the shafts of the motors may be connected by belts to pulleys on the shafts of the machines, in which case the motors will be arranged to fall away from the machines to apply tension to the driving belts.

In the copending application of Hyman Maimin, Serial No. 343,216, filed December 8, 1919, there is shown an arrangement of this kind in which the position of the motor is controlled by means of a treadle connected to the motor by a cord or the like and adapted to be actuated by a spring to swing the motor in such a manner as to disengage the friction pulley from the hand wheel, or slacken the driving belt, as the case may be, wherever it is desired to stop the machine. When the effect of the spring is overcome by pressure upon the treadle, the motor will swing by gravity into position to transmit power to the machine, either by means of a friction pulley, or by means of a driving belt. For most rapid production it is generally considered that best results are obtained if sewing machines are normally operated at a predetermined speed to which the operator is required to conform in the performance of his work. In the apparatus of the copending application referred to above, there is a flexible or lost motion connection between the treadle and the motor, and this connection is so arranged that the normal movement imparted to the treadle will be sufficient to slacken the connection, so that the motor will be held in operative relation to the machine by its own weight unaffected by the opposing effect of the treadle spring. The arrangement does, however, permit the speed of the machine to be controlled, for if the treadle is not pressed downwardly to its full extent, the flexible connection will remain taut and balance the weight of the motor, so that the pressure with which its friction pulley is held against the hand wheel of the machine will be lessened; or, in case a belt drive is employed, the effect of the weight of the motor in producing belt tension will be partly overcome. In either case there will be more slip in the driving connections, which will result in decreased speed of the machine.

With arrangements of the character described above, the motor is required to swing through only a comparatively small arc between its extreme positions, and through an even smaller arc when its position is changed to alter its frictional engagement with the pulley or to change the tension of the driving belt to produce changes in the speed of the machine. In order to impart the required movement to the motor to permit the machine to be started and stopped and its speed to be controlled, it is necessary that the connection between the motor and the treadle be accurately adjusted, and that the treadle be located in a definite position to maintain this adjustment; for variations in position of the treadle with a given length of cord will affect the position of the motor and prevent it from occupying its proper position with respect to the sewing machine to secure the desired control. In order that the treadle may be kept in proper position it must be fastened in place or be of relatively massive construction.

It is an object of this invention to provide an arrangement for controlling sewing machine motors mounted in the manner described above, which shall permit the use

of a light and simple treadle which may be placed at any convenient point, or may even be changed from time to time without affecting the adjustment of the parts of the device. This object of the invention is attained by the provision of an actuating member associated with the motor and connected to the treadle or other controlling device by a flexible, incompressible member, within which are means for controlling the actuating member, in accordance with the movement of the treadle or other device.

In arrangements such as described above, in which the machine is controlled by changing the position of the motor, the latter may be mounted upon a suitable bracket adapted to be attached to the frame of the machine so as to leave the table of the sewing machine free; or the motor may be mounted upon a support attached to the table of the machine, which arrangement is particularly adapted for those cases in which the frame of the machine carries mechanism which might interfere with the attachment of a bracket thereto. In those cases in which the motor is mounted upon the table of the machine; it may be desirable to place the motor below the table; and in the copending application of Hyman Maimin, Serial No. 350,243, filed January 8, 1920, there is shown an arrangement of this character in which the support is so constructed that it may be attached to the top or to the bottom of the table, as may be desired, and in which the lost motion connection between the treadle and the motor is obtained by means of a lever mounted on the support and having one arm adapted to be brought into engagement with the motor when it is mounted above the table, and a second arm adapted to be brought into engagement with the motor when the support is inverted to bring the motor below the table.

In order that the apparatus of the present invention may possess the greatest utility, it is so constructed that it may be used for controlling the position of a motor mounted upon a bracket adapted to be attached to the frame of a sewing machine; or it may be used for controlling the position of a motor mounted upon a support which may be placed on top of the table or below the same. In order to avoid the use of different pieces of apparatus for different arrangements of mounting the motor, the element by which movement is imparted to the motor is so constructed that it may be used when the motor is mounted above the table, or when it is below the same, by simply reversing its position: and the mechanism connected to the treadle is so constructed that it may be conveniently and quickly attached to the element in either position of the element.

The particular nature of the invention, as well as other objects and advantages thereof, will appear more clearly from a description of certain preferred embodiments, as illustrated in the accompanying drawings, in which—

Fig. 1 is an end elevation of a sewing machine showing the motor mounted on top of the table and arranged for a belt drive;

Fig. 2 is a side elevation of the apparatus of Fig. 1;

Fig. 3 is a detail view in section of part of the controlling mechanism;

Fig. 4 is a plan view of the treadle;

Fig. 5 is an end view of a sewing machine with the motor arranged below the table of the machine and adapted to be controlled by liquid pressure mechanism;

Fig. 6 is an end view of a machine in which the motor is mounted upon a bracket attached to the frame of the machine; and

Fig. 7 is a detailed view of the interchangeable element used for controlling the position of the motor.

The sewing machine illustrated somewhat diagrammatically in the drawings, comprises a table 10 carried upon standards 11 and serving as a support for the frame 12 which consists of a vertical portion and a horizontal portion carrying at its outer end the usual casing within which the mechanism for reciprocating the needle is mounted, this mechanism being driven by a shaft carrying a belt pulley 13 and a hand wheel 14. An electric motor 15 is provided for driving the machine by means of a belt 16 passing over pulley 13 and over a pulley on the shaft of the motor. The motor 15 is provided with lugs 17 adapted to receive a pin 18 extending between the standards of a pedestal 19 having a flat base 20 adapted to engage the top or the bottom of the table 10, and a flange 21 adapted to engage the edge of the table and be attached thereto by means of screws 22 passing through the flange.

For the purpose of controlling the position of the motor, there is provided a lever 23, the construction of which appears most clearly in Fig. 7, and which is preferably mounted upon the pin 18 between the standards of the pedestal. One of the arms 24 of the lever is provided at its outer end with a lateral extension 25 having a slot and aperture 26 for the attachment of the controlling mechanism. The other arm 27 of the lever is provided with a lateral extension 28 having a slot and aperture 29, and this arm is also provided with a projection 30 adapted to be brought into engagement with the casing of the motor when the lever is rotated. The lever is provided near its pivot with an extension 31 adapted to engage a pin 32 projecting from one of the standards of the pedestal to limit the movement of the lever and cause the latter to act as a stop

to limit the movement of the motor toward the machine.

In the embodiment of the invention shown in Figs. 1 to 4, the motor is controlled from a treadle by means of a mechanical connection, which employs as part of its structure a flexible medium consisting of an incompressible guide member and an inextensible operating member which is commonly known as Bowden wire. Projecting from the flange 21 of the pedestal 19 is a bracket 33 provided with an aperture adapted to receive a socket 34 on the end of a cylinder 35 within which is slidably mounted a cylinder 36 provided at its upper end with an extension 37 adapted to fit within one of the apertures 26 or 29 in lever 23, according to the position of the latter. Within the cylinders 35 and 36 is a spring 38 which normally tends to separate the cylinders and swing the lever 23 in a direction to tilt the motor toward the machine and slacken the driving belt 16 as indicated in Fig. 1.

For the purpose of overcoming the effect of spring 38 so as to draw the cylinder 36 within the cylinder 35 to permit the motor to swing away from the machine, there is provided an inextensible wire or cable 39, which at its upper end is connected to a button 40 adapted to be seated upon the top of the extension 37. The cable 39 passes through the coils of the spring 38 and then through a guide 41 attached to the lower end of cylinder 35 and consisting of a length of coiled wire, each turn abutting the next one, thus constituting an incompressible member, such as forms one of the elements of a Bowden wire.

The cable 39 and its guide 41 extend to a treadle structure comprising a base 42 having an upright portion 43 to the outer face of which the guide 41 is attached by means of a socket 44. The cable 39 passes through the upright portion 43 and along the outer face of a member 45 which is attached to a treadle 46 pivoted as at 47 between lugs located at the junction of the portions 42 and 43. The treadle 46 carries a plate 48 which is preferably roughened so that a firm grip may be obtained with the shoe of the operator.

In assembling the mechanism described above the bracket 19 is fastened to the table 10 in proper position to bring the pulley on the shaft of the motor in alinement with the machine pulley 13. The cylinder 35 is then placed upon the bracket 33 with its extension 34 passing through the aperture in the bracket. The bracket may be provided with a slot communicating with the aperture and through which the member 41 may be inserted to permit the extension 34 to be seated in the aperture. By depressing the treadle 46 the cable 39 may then be drawn through its guide 41 to draw the cylinder 36 into the cylinder 35 against the action of the spring 38 so that the extension 37 may be inserted in the aperture 26 of the lever 23. When the treadle is released the spring 38 will lift the cylinder 36 out of cylinder 35 so that the top of cylinder 36 will come into engagement with the extension 25 of lever 23 and move the lever in a direction to swing the motor toward the machine and slacken the driving belt.

When it is desired to start the machine into operation the treadle 46 will be depressed to overcome the effect of the spring 38 and thus draw the cylinder 36 into the cylinder 35 so as to permit the motor to fall away from the machine until the belt has become sufficiently tight to permit power to be transmitted to the machine. Preferably the parts should be so constructed and proportioned that when the treadle is depressed to its maximum extent the cylinder 36 will be drawn sufficiently within the cylinder 35 to take the top of the cylinder 36 out of contact with the extension 25 of the lever, under which conditions the driving belt will be maintained under tension by the weight of the motor unaffected by any opposing effect of the spring 38. As a result of this arrangement the machine may be driven at the predetermined maximum speed regarded as suitable for the most efficient operation. In case it is desired to lessen the speed of the machine, the treadle may be lifted sufficiently to permit the spring 38 to lift the motor slightly to partially overcome the effect of its weight upon the tension of the driving belt. There will thus be produced between the belt and the pulleys to which it is connected a certain amount of slip which will cause a decreased speed of the machine without requiring that the speed of the motor be changed by means of a rheostat or similar device.

Since the motor is mounted to swing about a pivot lying below its center of gravity, a sudden release of the treadle might cause the spring 38 to throw the motor over to the other side of its pivot; in which case it would be in such a position that a subsequent depression of the treadle would not allow the motor to assume its operative position with respect to the driving belt. It is therefore desirable to provide an arrangement for limiting the movement of the motor when it is lifted so as to slacken the driving belt. The mechanism shown herein is so designed that when the projection 31 on lever 23 engages the pin 32 the projection 30 will be in position to limit the movement of the motor toward the machine and prevent it from being thrown over to the other side of its pivot.

It has been found in practice that it is somewhat disconcerting to certain operators to have the motor placed above the table,

particularly in those cases where the operators have been accustomed to work with machines in which the motors were not normally in sight. The presence of the motors and their supports upon the tables is also objectionable in many cases as they constitute obstructions and interfere with the use of the tables for holding the work, particularly if the latter be voluminous. In order to place the motor beneath the table the pedestal 19 is inverted and attached to the table as indicated in Fig. 5, and the lever 23 is mounted upon the pin 18 in a position reverse to that which it occupies when the pedestal is mounted upon the top of the table, as in Fig. 1. With the motor mounted below the table it is necssary that it be lifted toward the machine to slacken the driving belt when it is desired to stop the machine. Fig. 5 shows mechanism for controlling the position of the motor based upon the use of liquid pressures instead of upon a mechanical connection as in Fig. 1; but it will be understood that the mechanism of this last named figure may be employed for controlling the position of the motor when it is mounted below the table; and also that the liquid pressure mechanism shown in Fig. 5 may also be employed for controlling the position of the motor when the latter is mounted above the table.

The controlling mechanism shown in Fig. 5 comprises an expansible member 50, to one head of which a tube 51 is connected and the other head of which carries a member 52 provided with a pin 53 adapted to fit within the aperture in the bracket 33 projecting from the pedestal upon which the motor is mounted. The expansible member 50 is adapted to be seated upon the extension 28 projecting from the arm 27 of lever 23, with the tube 51 passing through the aperture 29.

The treadle adapted to be used with the controlling mechanism of Fig. 5 comprises a base 54 having an upright 55 which serves as an abutment for one end of a coiled spring 56. The other end of the spring is in engagement with the head 57 of an expansible member 58, having its interior in communication with the tube 51. The other head 59 of the expansible member is attached to the base 54 and thus serves as a support for the member. The treadle 60 is connected by means of a pin 61 to the head 57.

The expansible members 50 and 58 and the tube 51 are filled with suitable liquid. When the treadle is released the spring 56 compresses the expansible member 58 and forces liquid out of the same into the expansible member 50 which is thus distended and by means of the lever 23 lifts the motor toward the machine to slacken the driving belt sufficiently to prevent any power being transmitted. In order to drive the machine the treadle is depressed to overcome the effect of spring 56 and distend the extensible member 58 so that the liquid may flow into this member to permit the motor to fall away from the machine and place the driving belt under tension. As in the case of the mechanical connection shown in Fig. 1 the parts should be arranged so that when the treadle is completely depressed the liquid may flow from the expansible member 50 sufficiently to prevent this member from having any effect upon the motor, with the result that the tension in the driving belt depends solely upon the weight of the motor and is unaffected by any opposing effect produced by the spring 56. The motor of the machine may thus be driven at the predetermined speed required for most efficient operation, but if at any time it is desired that the speed of the machine be changed the treadle may be released sufficiently to permit the spring 56 to force liquid out of the expansible member 58 into the expansible member 50 to exert a lifting effect upon the motor, so that slip may occur between the pulleys and the belt with resulting decrease in the speed of the machine.

In some cases it may be desired to mount the motor upon the frame of the machine, and in Fig. 6 there is shown an arrangement of this character in which the motor is mounted upon a bracket like that shown in the copending application of Hyman Maimin, Serial No. 343,215, filed December 8, 1919. This bracket comprises a supporting member 62 provided with upper and lower extensions 63 and 64, respectively, adapted to fit over the top and bottom of the horizontal arm of the frame. Associated with the supporting member 62 is an auxiliary supporting member 65 having a flat upper portion adapted to be seated upon the top of the machine frame and provided with one or more apertures through which the spool spindle 66 of the machine may be passed. The depending portion of member 65 is turned upwardly as at 67, thus forming a hook within which the main supporting member 62 may be received. The free end of the main supporting member is bent outwardly and carries a bracket 68 having a pivot pin 69 upon which the motor 15 is mounted. One of the members of the bracket 68 is provided with extensions 70 and 71, which serve as abutments for the cylinder 35 of a controlling mechanism, such as shown in Fig. 1 and described above. The other cylinder 36 of the controlling mechanism is connected to a lever 72 similar in general construction to lever 23.

As shown in Fig. 6 power may be transmitted from the motor to the machine by means of a driving belt, but the mechanism shown in this figure may also be used for supporting the motor in such a position that a friction pulley on the shaft of the motor

may be brought into engagement with the hand wheel 14 of the machine. In this case the motor is arranged to fall toward the machine when the latter is to be driven and the cylinder 35 is mounted upon the extension 71 and the lever 72 is placed upon the pivot pin 69 in reverse position. As thus arranged the spring 38 between the cylinders 35 and 36 will normally lift the motor away from the machine.

Since the motor is mounted above its pivot, with both forms of drive, it is necessary to provide stop mechanism for preventing the motor from being thrown over its pivot upon a sudden release of the treadle. When the motor is mounted for a belt drive as shown in Fig. 6, the stop 31 is arranged to be brought into engagement with a pin 32 to limit the movement of the lever and cause its extension 30 to act as a stop for the motor. When the motor is arranged for a friction drive the lever is reversed upon the bracket, and in this case the stop 31 engages the other side of the pin 32 to limit the movement of the motor as it is swung away from the machine.

While the form of mechanical controlling mechanism employing a Bowden wire has been shown in connection with the apparatus of Fig. 6, it will be understood that a liquid pressure mechanism such as has been shown in Fig. 5 may be employed for controlling the position of the motor. It will also be understood that various other changes in the details of construction of the several embodiments of the invention may be made without departing from the principle thereof as defined in the appended claims.

We claim:

1. In a sewing machine provided with a driving wheel, and a motor mounted to swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of controlling means adapted to be actuated by an operator, an actuating member associated with the motor, and an operating connection between the controlling means and the actuating member comprising a flexible, incompressible member and means within the member for moving the actuating member in accordance with with the movement of the controlling member.

2. In a sewing machine provided with a driving wheel, and a motor mounted to swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of a treadle, an actuating member associated with the motor, a fixed member associated with the treadle, a fixed member associated with the actuating member, a flexible, incompressible member connected between the fixed members, and means within the flexible member for moving the actuating member in accordance with the movement of the treadle.

3. In a sewing machine provided with a driving wheel, and a motor mounted to swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of means for lifting the motor out of operative relation to the wheel of the machine, means adapted to be actuated by an operator, a flexible, incompressible member, fixed at its ends adjacent to each of said means, and means within the flexible member connected to the lifting means and the means adapted to be actuated by an operator whereby the effect of the lifting means may be overcome by an operator to permit the motor to move into operative relation to the wheel of the machine by its own weight.

4. In a sewing machine provided with a driving wheel, and a motor mounted to swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of a spring for lifting the motor out of operative relation to the wheel of the machine, a treadle, an abutment for one end of the spring, a flexible, incompressible member conected to the abutment, a mounting for the other end of the flexible member, an inextensible member within the flexible member and connected between the treadle and the other end of the spring for overcoming the effect of the spring to permit the motor to move into operative relation to the wheel of the machine by its own weight.

5. In a sewing machine provided with a driving wheel, and a motor mounted to swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of a cylindrical member mounted adjacent to the motor, a second cylindrical member mounted within the first named cylindrical member and operatively connected to the motor, a spring within the cylindrical members for separating them to lift the motor out of operative relation to the wheel of the machine, a flexible, incompressible member connected to the first named cylindrical member, a treadle, a member associated with the treadle and to which the other end of the flexible member is connected, an inextensible member within the flexible member and connected between the treadle and the second cylindrical member whereby the members may be drawn together to compress the spring to permit the motor to move into operative relation to the wheel of the machine by its own weight.

6. In a sewing machine provided with a driving wheel, and a motor mounted to

swing about an axis adjacent to the wheel and to be held in operative relation to the wheel of the machine by its own weight the combination of an expansible member mounted adjacent to the motor and operatively connected thereto, a treadle, a second expansible member mounted adjacent to the treadle, a flexible tube connected between the expansible members and filled with a fluid, a spring adapted to compress the second expansible member to force fluid into the first expansible member to distend the same and lift the motor out of operative relation to the wheel of the machine, and a connection between the second expansible member and the treadle for overcoming the effect of the spring, when the treadle is actuated, to distend the second expansible member and allow fluid to flow out of the first expansible member to permit the motor to fall into operative relation to the wheel of the machine.

7. In a sewing machine mounted upon a table and provided with a driving wheel, the combination of a support adapted to be mounted above or below the table, a motor mounted upon the support and adapted to be held in operative relation to the wheel of the machine by its own weight, a bracket attached to the support, a lever mounted upon the support in operative relation to the motor, means between the bracket and the lever for forcing them apart to lift the motor out of operative relation to the wheel of the machine, and means under the control of an operator for overcoming the effect of said last named means to permit the motor to move into operative relation to the wheel of the machine by its weight.

8. In a sewing machine mounted upon a table and provided with a driving wheel, the combination of a support adapted to be mounted above or below the table, a motor mounted upon the support and adapted to be held in operative relation to the wheel of the machine by its own weight, a bracket attached to the support, a lever mounted upon the support in operative relation to the motor, and provided at its ends with lateral extensions having apertures therein, means mounted between the bracket and one of the extensions for swinging the lever to lift the motor out of operative relation to the wheel of the machine, mechanism adapted to be actuated by an operator, and connections between the mechanism and the means whereby the lifting effect of the means may be overcome to permit the motor to move into operative relation to the wheel of the machine by its weight.

9. In a sewing machine mounted upon a table and provided with a driving wheel, the combination of a support adapted to be mounted above or below the table, a motor mounted upon the support and adapted to be held in operative relation to the wheel of the machine by its own weight, a bracket attached to the support and provided with an aperture, a lever mounted upon the support in operative relation to the bracket and provided at its ends with lateral extensions having apertures therein, means mounted between the bracket and one of the extensions for swinging the lever to lift the motor out of operative relation to the wheel of the machine, said means being provided with portions adapted to enter the apertures in the bracket and the lever to hold the means in place, and mechanism under the control of an operator whereby the lifting effect of said means may be overcome to permit the motor to move into operative relation to the wheel of the machine by its own weight.

In testimony whereof we affix our signatures.

DAVID S. MAIMIN.
THOMAS VEITCH.