J. J. WOOD.

MOTOR DRIVE.

APPLICATION FILED JULY 15, 1915.

1,193,490. Patented Aug. 1, 1916.

Fig. 1.

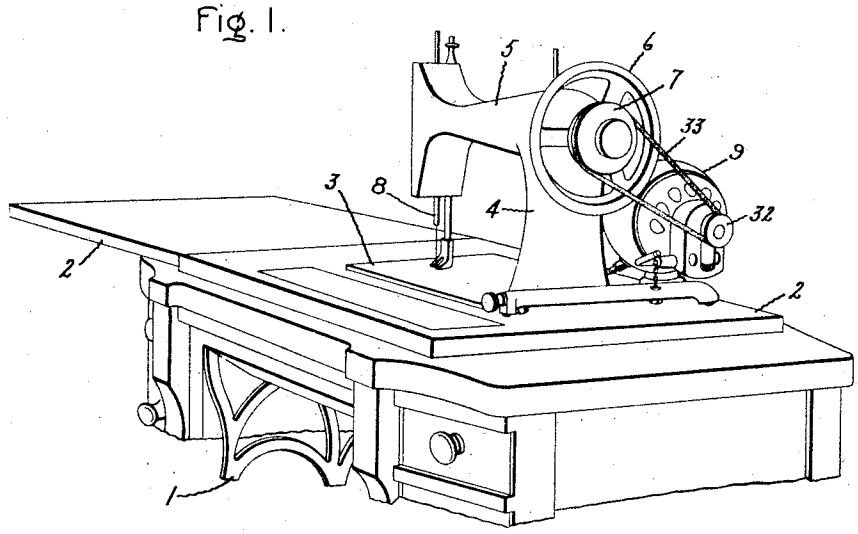


Fig. 3.

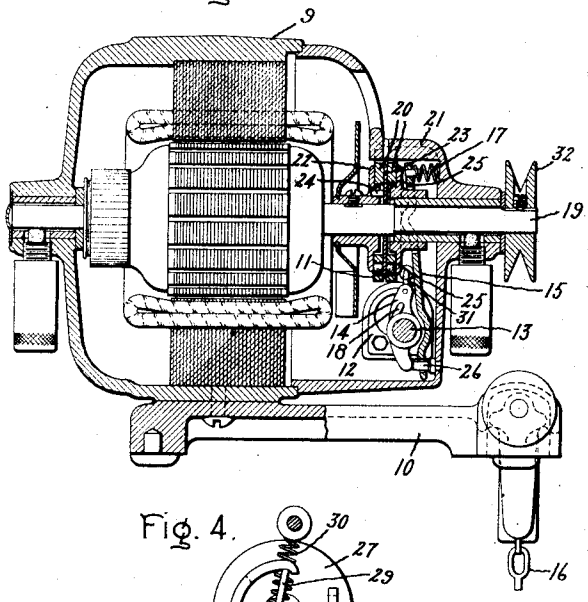


Fig. 2.

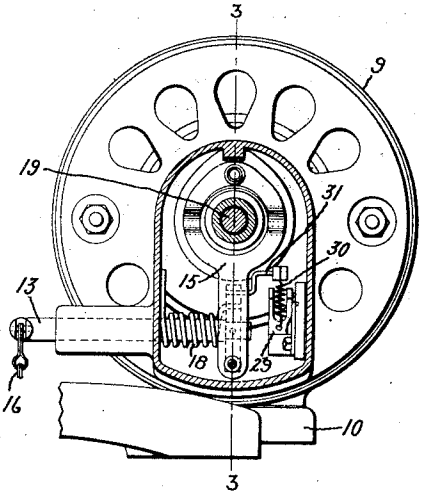
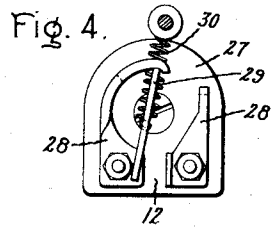


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MOTOR-DRIVE.

1,193,490. Specification of Letters Patent. Patented Aug. 1, 1916.

Application filed July 15, 1915. Serial No. 40,118.

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, in the county of Allen, State of Indiana, have invented certain new and useful Improvements in Motor-Drives, of which the following is a specification.

My invention relates to motor drives and is particularly applicable to electric motor drives for sewing machines and the like.

My invention has for its object a novel arrangement and construction of an electric motor drive in which the electric motor is controlled by a switch, a friction brake and a single actuating member for the switch and brake which closes the switch to complete the motor circuit and thereafter progressively decreases the effectiveness of the brake.

The various features of novelty which characterize my invention are pointed out with particularity in the claims which are annexed to and form a part of this specification.

For a better understanding of my invention reference may be had to the following description taken in connection with the accompanying drawing, in which—

Figure 1 is a sewing machine equipped with an electric motor drive in accordance with my invention; Fig. 2 is a side view of the motor of Fig. 1 with parts broken away; Fig. 3 is a sectional view on the line 3—3 of Fig. 2, and Fig. 4 is a detailed view of a switch for the motor.

In the drawing, 1 is the supporting stand of a sewing machine on the top of which is mounted the usual table 2 in which is countersunk the bed-plate 3 of the sewing machine. The head of the sewing machine is mounted on the bed-plate 3 and consists of the usual pillar 4, horizontal arm 5, fly-wheel 6 and drive wheel 7, and contains the usual mechanism for transmitting motion from the drive wheel 7 to the needle bar 8. The bed-plate 3 contains the usual shuttle and feed mechanism and means for transmitting motion thereto through the pillar and drive wheel. The ordinary foot power mechanism is mounted in the stand 1 and consists of a pivoted treadle adapted to transmit power through a connecting rod to a crank of the main driving wheel, and for foot operation, power is transmitted from the main driving wheel to the driving wheel 7 through a belt (not shown). The motor drive for the machine comprises an electric motor 9 mounted on a base 10. These parts may be of any well known or usual construction.

The motor is controlled by a friction brake 11 and a switch 12, both of which are actuated by a common actuating lever 13 on which is mounted a member 14. A brake lever 15 is operatively connected with the brake 11 and with the member 14. The switch 12 is positively connected with the member 14. The lever 13 in the normal position shown in the drawing is out of engagement with the brake lever 15, and if it is rotated by means of a cord or chain 16, it first closes the switch 12 to complete the motor circuit and thereafter engages the brake lever to progressively decrease the effectiveness of the brake 11. The chain 16, which is adjustable for length, may be connected to the ordinary foot treadle. A spring 17 engages the brake lever 15 and acts in a direction to apply the brake. A second spring 18 is operatively associated with the member 14 and acts in a direction to normally maintain the member in the position in which the switch 12 is open and the brake 11 applied. This spring 18 is shown as surrounding the actuating lever 13, one end being fastened in the member 14 and the other end engaging the frame of the motor. All of these parts, with the exception of the end of lever 13 and chain 16, are contained within the motor housing which makes a very compact structure and protects them from injury.

The brake 11 preferably comprises stationary and rotatable friction plates surrounding the shaft 19 of the motor. The stationary plates 20, which may be made of fiber, have notches which engage a projection 21 on the motor frame. The inner rotatable plate 22 is fastened to the shaft of the motor. The middle rotatable plate 23, which is split to make it act as a spring so that the brake will not grip too quickly, is placed between the two stationary plates 20 and is connected to the inner plate by a dowel pin 24. The outer plate 25 is also stationary. The brake lever 15 is pivoted to

the frame of the motor on a pin 26 and is pressed inwardly to engage the outer friction plate 25 by the spring 17.

The switch 12 is mounted on an insulating block 27 in the motor frame and comprises two stationary contacts 28 and a movable switch blade 29. The switch blade is controlled by a spring 30 one end of which is fastened thereto and the other end of which is insulated from and fastened to an arm 31. The arm 31 is fastened to the member 14 and rotates therewith and in its rotation changes the angle of pull of spring 30 on switch blade 29 so that it moves from the off position shown in Fig. 4 to the position in which the contacts 28 are connected together to complete the circuit through the motor.

The motor is placed on the machine as shown in Fig. 1 with the pulley 32 on its shaft 19 lined up with the drive wheel 7. The method of attaching the motor and its base to the machine is clearly described in the application above referred to. A belt 33 connects the pulley 32 with a drive wheel 7. If the motor is connected to a suitable source of current, and the treadle is moved so as to pull downward on the chain 16 the lever 13 is rotated and with it the member 14. The rotation of member 14 first moves the arm 31 to throw the switch blade 29 into the position in which it connects contacts 28 to complete the circuit through the motor. The motor being a series motor immediately exerts maximum torque, but the pressure between the friction plates of the brake 11 has not been appreciably relieved and consequently the brake is still applied and the motor is prevented from rotating. Further motion of the treadle to pull downward on the chain rotates the member 14 into engagement with the brake lever 15 and moves it so as to compress spring 17, relieving the pressure between the friction plates. The motor now begins to rotate, rotating the pulley 32 and through the belt 33 the drive wheel 7 of the machine. If the spring 17 is only partially compressed, the pressure between the friction plates is only partially reduced, and the motor and machine run at minimum speed. If the spring 17 is compressed so as to gradually relieve the pressure between the friction plates, the braking effect on the motor is gradually reduced, permitting a gradual increase in speed until maximum speed is reached. When the treadle is gradually rocked back, the spring 18 gradually rocks member 14 back toward the position shown in Fig. 3, the spring 17 pressing brake lever 15 against friction plate 25 and gradually increasing the friction between friction plates 20 and friction plates 22 and 23, thereby causing a gradual reduction in speed of the motor and machine until the motor is finally brought to a standstill. The spring 18 then moves the member 14 so as to move arm 31 to change the angle of pull of spring 30 and cause it to move switch blade 29 into the disconnected position, as indicated in Fig. 4.

The particular arrangement for mounting the motor on the table of the sewing machine, in which the base on which the motor is mounted is provided with projecting members fitting into the belt holes of the sewing machine table to aline the motor with the head of the sewing machine, is not claimed in this application but forms the subject matter of my co-pending application for motor drives, Serial No. 40,117, filed July 15, 1915.

I desire it to be understood that my invention is not limited to the particular arrangement shown and described and I aim in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The combination with a machine to be driven, of an electric motor adapted to drive the same, said motor having a frame, and means for controlling said motor comprising a switch for the motor supply circuit, a brake for the motor shaft, a brake lever operatively connected with said brake and pivotally mounted on the motor frame, an actuating lever, a member mounted on said actuating lever, said member being normally positioned out of engagement with said brake lever and rotatable to engage said brake lever to release said brake, means positively connecting said switch and said member, spring means engaging said brake lever for normally applying said brake, and means for actuating said actuating lever to rotate said member, said member in its rotation first closing said switch and thereafter progressively releasing said brake.

2. The combination with a machine to be driven, of an electric motor adapted to drive the same, said motor having a frame, and means for controlling said motor comprising a switch for the motor supply circuit, a brake for the motor shaft, a brake lever operatively connected with said brake and pivotally mounted on the motor frame, an actuating lever, a member mounted on said actuating lever, said member being normally positioned out of engagement with said brake lever and rotatable to engage said brake lever to release said brake, means positively connecting said switch and said member, spring means engaging said brake lever for normally applying said brake, other spring means operatively associated with said member for normally maintaining said member in the position in which the switch is open and the brake applied, and means for actuating said actuating lever to rotate said

member, said member in its rotation first closing said switch and thereafter progressively releasing said brake.

3. The combination with a machine to be driven, of an electric motor adapted to drive the same, said motor having a frame, and means for controlling said motor comprising a switch for the motor supply circuit, stationary and rotatable friction plates surrounding the motor shaft, a brake lever operatively connected with said friction plates and pivotally mounted on the motor frame, an actuating lever, a member mounted on said actuating lever, said member being normally positioned out of engagement with said brake lever, and rotatable to engage said brake lever to release the pressure between said friction plates, means positively connecting said switch and said member, spring means engaging said brake lever for normally maintaining said friction plates in engagement with each other, and means for actuating said actuating lever to rotate said member, said member in its rotation first closing said switch and thereafter progressively releasing the pressure between said friction plates.

4. The combination with a machine to be driven, of an electric motor adapted to drive the same, said motor having a frame, and means for controlling said motor comprising a switch for the motor supply circuit, stationary and rotatable friction plates surrounding the motor shaft, a brake lever operatively connected with said friction plates and pivotally mounted on the motor frame, an actuating lever, a member mounted on said actuating lever, said member being normally positioned out of engagement with said brake lever and rotatable to engage said brake lever to release the pressure between said friction plates, means positively connecting said switch and said member, spring means engaging said brake lever for normally maintaining said friction plates in engagement with each other, other spring means operatively associated with said member for normally maintaining said member in the position in which the switch is open and the friction plates engage each other, and means for actuating said actuating lever to rotate said member, said member in its rotation first closing said switch and thereafter progressively releasing the pressure between said friction plates.

In witness whereof, I have hereunto set my hand this 12th day of July, 1915.

JAMES J. WOOD.