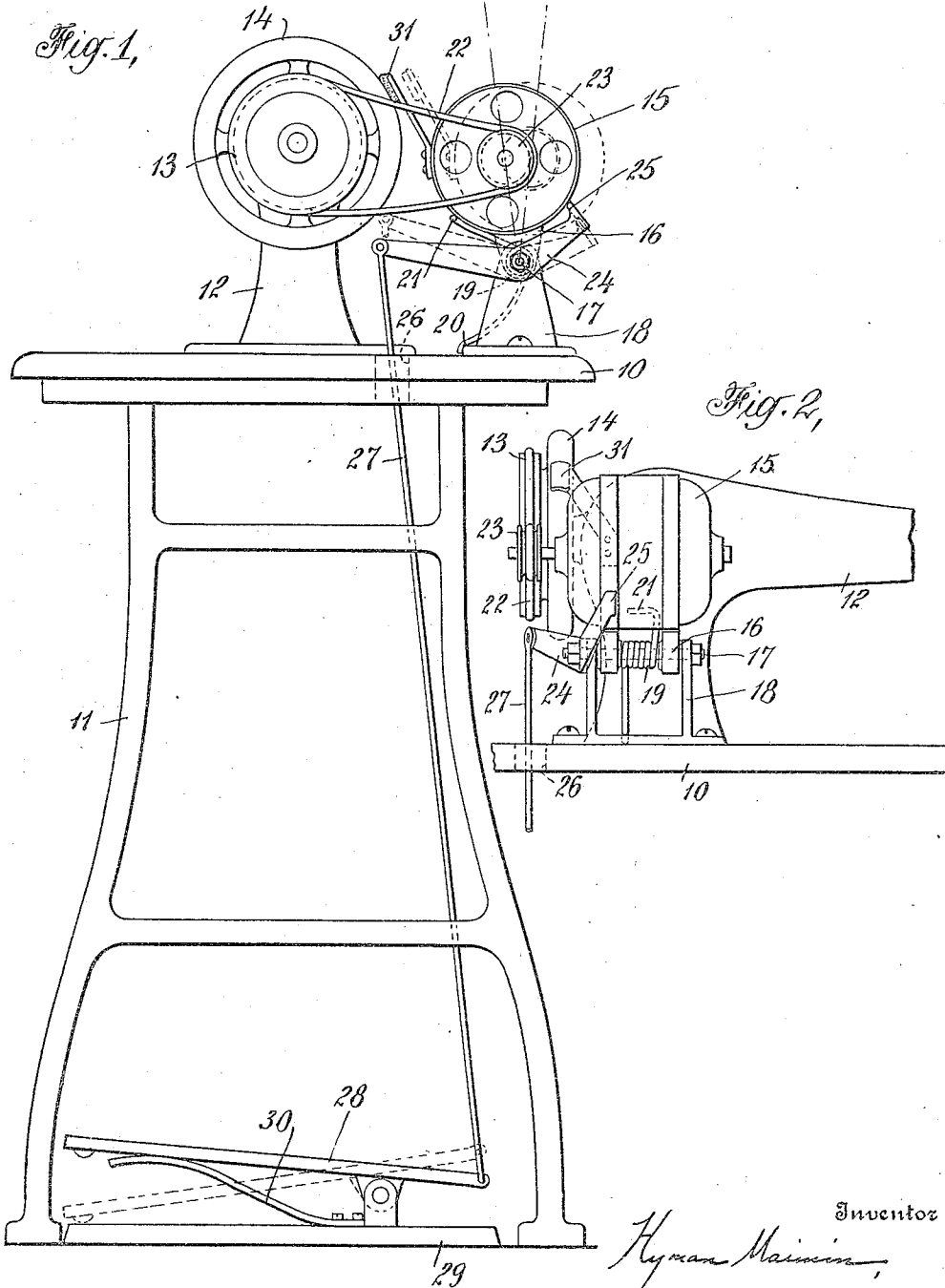


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MOTOR DRIVE FOR SEWING MACHINES.
APPLICATION FILED APR. 30, 1920.

1,422,218.

Patented July 11, 1922.
2 SHEETS—SHEET 1.



Inventor

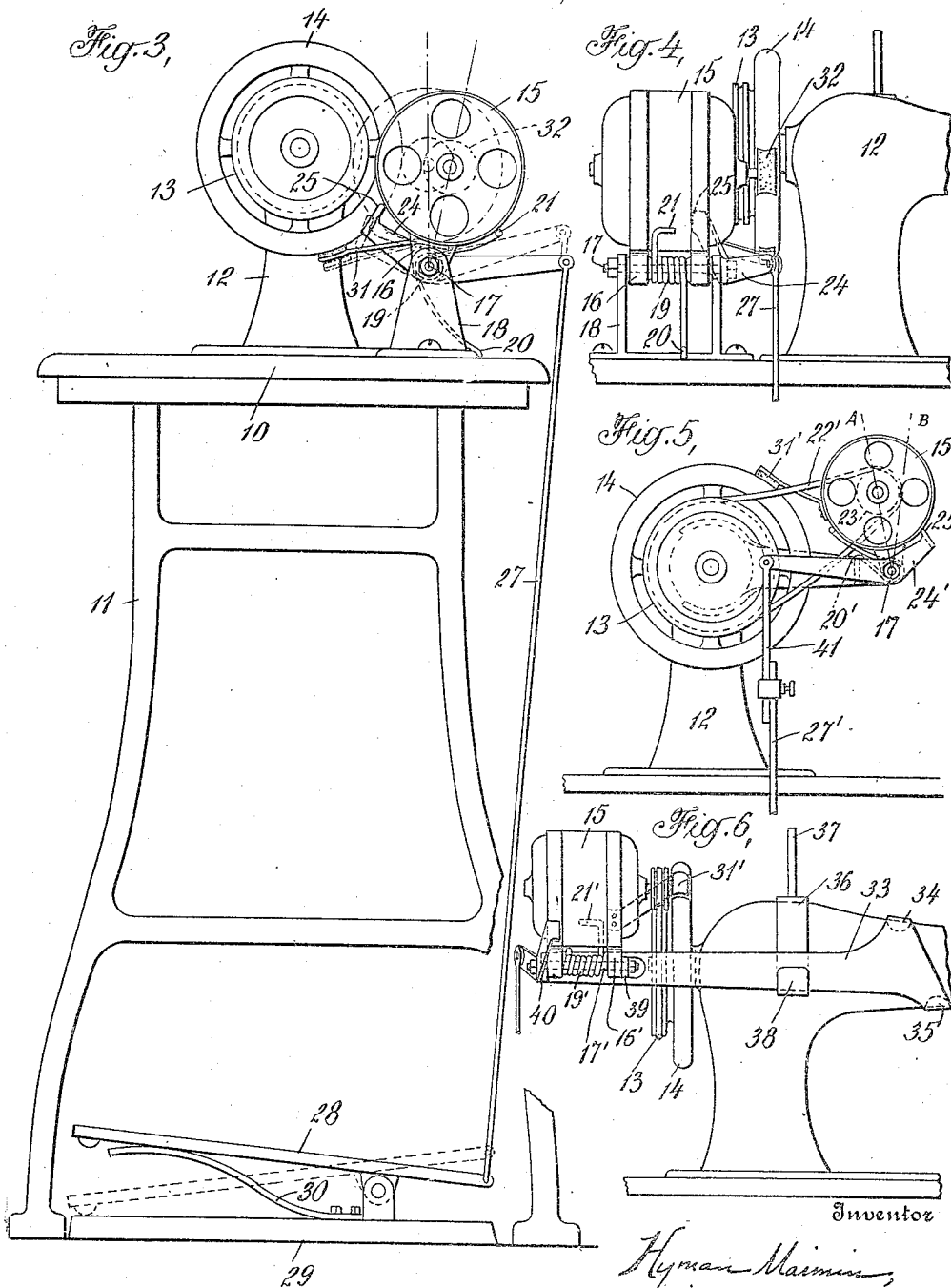
Hyman Maimin,

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UNITED STATES PATENT OFFICE.

HYMAN MAIMIN, OF NEW YORK, N. Y.

MOTOR DRIVE FOR SEWING MACHINES.

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Specification of Letters Patent.

Patented July 11, 1922.

Application filed April 30, 1920. Serial No. 377,799.

To all whom it may concern:

Be it known that I, HYMAN MAIMIN, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Motor Drives for Sewing Machines; and I 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 motor drives for sewing machines.

In my co-pending application, Serial No. 343,216, filed December 8, 1919, there is shown a motor drive for sewing machines in which it is intended that the motor shall run continuously, and whenever it is desired that the machine shall be driven, the motor is moved into operative relation to the machine, by bringing a friction wheel on its shaft into operative relation to the machine, or by causing a driving belt to be placed under tension so that it will transmit power from the motor to the machine. This arrangement avoids the use of the usual rheostat which is not only expensive, but is a source of most of the troubles that arise in connection with motor drives for sewing machines. Under normal conditions the motor will be held in operative relation to the machine by its own weight in such a manner that the speed of the machine will be of a predetermined maximum to which the operator is required to conform in order to obtain the greatest production. The arrangement is, however, such that it is possible for the operator to produce a slight change in the relative position of the motor with respect to the machine so as to allow some slip between the friction pulley of the motor and the hand wheel of the machine or between the driving pulleys and the belt according to whichever arrangement is employed. The position of the motor is preferably controlled by a treadle which has a lost-motion connection with the motor, and is normally actuated by a spring to lift the motor to disengage the friction pulley from the hand wheel, or slacken the driving belt, as the case may be.

When the effect of the spring is overcome by pressure upon the treadle, the weight of the motor will cause it to fall into position

to transmit power to the machine. When the motor is in this position, the operating connection will be released sufficiently to permit the motor to be held in operative relation to the machine by its own weight, independently of the effect of the treadle spring.

In the apparatus shown in my co-pending application referred to above, the weight of the motor is depended upon to hold its friction pulley against the hand wheel of the machine, or to produce sufficient tension in the driving belt to permit power to be transmitted from the motor to the machine. When this arrangement is employed in connection with motors of relatively light weight, the centrifugal effect of the rapidly rotating hand wheel of the machine, or the effect of centrifugal force acting upon the driving belt may tend to lessen the pressure with which the motor bears against the hand wheel of the machine, or to decrease the tension of the driving belt. In such cases there will be a resultant decrease in the speed of the machine due to the slip between the hand wheel and the friction pulley of the motor, or between the belt and the pulleys over which it passes.

It is an object of this invention to provide a motor drive for sewing machines which will avoid the above noted disadvantages of the gravity form of drive, particularly in the case of relatively light motors.

In accordance with the invention, the motor is mounted to swing about an axis adjacent to the machine, and is adapted to be held in operative relation to the machine by a spring which is preferably associated with the pivotal mounting of the motor. For the purpose of overcoming the effect of the spring and swinging the motor out of operative relation to the machine there is provided a spring-pressed treadle having a lost-motion connection with the motor, which is so arranged that when the effect of the treadle spring is overcome by depressing the treadle, the motor will be held in operative relation to the machine by the spring associated with its mounting independently of the opposing effect of the spring acting upon the treadle. The arrangement is, therefore, such that it is possible, by partially depressing the treadle, to hold the motor in operative relation to the machine under the bal-

anced effect of the spring associated with the motor and the spring associated with the treadle.

In any arrangement in which the motor is removed from operative relation to the machine when it is desired to stop the latter, the momentum of the moving parts of the machine will cause them to run for a short period of time after the motor has been disconnected. In order to bring the machine quickly to rest, there is associated with the motor a brake which, when the motor is swung out of operative relation to the machine, is brought into engagement with the hand wheel of the machine to stop the motion of its moving parts.

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 provided with a motor mounted upon the table of the machine and arranged for a belt drive;

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

Fig. 3 is an end elevation of a sewing machine with the motor arranged for a friction drive;

Fig. 4 is a side elevation of the arrangement of Fig. 3;

Fig. 5 is an end elevation of a sewing machine having its driving motor mounted upon a bracket adapted to be attached to the frame of the machine; and

Fig. 6 is a side elevation of the apparatus of Fig. 5.

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 having a belt pulley 13 and handwheel 14. An electric motor 15 is provided for driving the machine. This motor carries lugs 16 adapted to receive a pin 17 supported between the uprights of a pedestal 18 which may be attached to the top of the table 10 in position to bring the motor in proper relation to the machine. Surrounding the pin 17 is a spring 19 having one end 20 hooked over the base of the pedestal, and the other end 21 bent at right angles and engaging the motor. The spring is wound about the pin 17 in such a manner as to swing the motor away from the machine to tighten the driving belt 22 which passes over the pulley 13 of the machine and a pulley 23 on the shaft of the motor.

For the purpose of controlling the posi-

tion of the motor there is provided a lever 24, preferably mounted upon the pin 17 outside of one of the standards of the pedestal 18. One arm of the lever is bent inwardly and formed with a projection 25 adapted to engage the motor. The other arm of the lever is extended and bent so that its outside end lies above one of the usual belt holes 26 in the table of the machine. A rod 27 passing through the belt hole is attached at one end to the inner end of the lever, and at the other end is connected to a treadle 28 mounted upon a base 29, which may be placed in a convenient position to be reached by the operator's foot. Underneath the treadle is a spring 30 which normally raises the treadle into the position shown in Fig. 1. The arms of the lever 24 and those of the treadle 28 should be proportioned so that when the treadle is depressed to its maximum extent, as indicated in broken lines in Fig. 1, the spring 19 will swing the motor 15 into the correspondingly indicated position and tighten the belt 22 sufficiently to permit power to be transmitted from the motor to the machine. After the motor has been swung away from the machine as far as it will be permitted to go by the belt, an additional movement should preferably be imparted to the lever 24 so that it may swing free of the motor or at least be held only lightly in contact with the latter. Under these conditions the motor will be independent of the lever and the belt tension produced by the spring 19 will not be lessened by any opposing effect of the treadle spring 30. The motor will thus drive the machine at the predetermined speed regarded as suitable for the most efficient operation. In case it is desired to lessen the speed of the machine the treadle 28 will be released sufficiently to swing the lever 24 into engagement with the motor and thereafter lift the motor slightly to partially overcome the effect of the spring 19 upon the tension of the belt. As a result of the lessened belt tension there will be produced between it and the pulleys to which it is connected a certain amount of slip which will cause a decreased speed of operation of the machine without changing the speed of the motor by means of a rheostat or similar device.

In order that the momentum of the moving parts of the machine may be checked quickly when the treadle is released to permit the spring 30 to overcome the effect of the spring 19 and swing the motor toward the machine, a brake 31, preferably consisting of spring metal and provided at its free end with a pad of yielding material, may be attached to the motor in such a position that it will engage the hand wheel 14 when the belt becomes so slack that no power will be transmitted to the machine. By forming the brake of spring metal it will yield slightly

when brought into engagement with the hand wheel so as to prevent sudden shocks upon the motor and the moving parts of the machine. The brake will also act as a stop to limit the movement of the motor, although the tension of the spring 19, as the motor swings toward the machine, will check the movement of the motor, and thus in effect form a stop.

10 In the embodiment of the invention shown in Figs. 3 and 4, the shaft of the motor is provided with a friction pulley 32, and the spring 19 is so arranged that when free to act it will swing the motor toward the machine to bring the friction pulley into engagement with the hand wheel 14 in order that power may be transmitted from the motor to the machine. The movement thus required to be imparted to the motor when the treadle 28 is depressed will be opposite to that required when a belt drive is employed. In order that the apparatus may be adapted to either form of drive, it is so-constructed that it may be used for a friction drive by placing the pedestal 18 upon the table in a position reverse to that which it occupies when the belt drive is employed. The parts of the apparatus should preferably be so arranged and proportioned that when used for a friction drive the end of the lever 24 to which the rod 27 is connected will extend beyond the table of the machine so that the rod clears the table, and it is not necessary to provide a special hole or slot to accommodate the rod. With the friction drive arrangement of Figs. 3 and 4, the brake 31 will be arranged so that it will engage the hand wheel of the machine as the motor swings away from the latter under the influence of spring 19.

When the motor is arranged for a friction drive complete depression of the treadle into the broken line position of Fig. 3 will permit the spring 19 to swing the motor and bring its pulley 32 into engagement with the hand wheel 14 to permit power to be transmitted from the motor to the machine. As in the case of the belt drive arrangement the lever 24 should preferably be swung out of engagement with the motor so that the friction pulley 32 will be held in engagement with the hand wheel 14 by the spring 19 unaffected by the opposing effect of the treadle spring 30. Under these conditions the motor will drive the machine at a predetermined maximum speed so long as the treadle is held in a completely depressed position. By releasing the treadle, however, its spring may be permitted to have some effect in overcoming the spring 19 and lifting the motor by means of the lever 24 so that slip may occur between the friction pulley and the hand wheel of the machine with resultant decrease in the speed of the latter.

65 In some cases it may be desirable to mount

the motor upon the frame of the machine, and in Figs. 5 and 6 there is shown an arrangement of this character in which the motor is mounted upon a bracket like that forming the subject matter of my co-pending application, Serial No. 343,215, filed December 8, 1919. This bracket comprises a supporting member 33 provided with upper and lower extensions 34 and 35 respectively, adapted to fit over the top and bottom of the horizontal arm of the frame. Associated with the member 33 is an auxiliary supporting member 36 having a flat top portion adapted to be seated upon the top of the machine frame and provided with one or more apertures through which the soool spindle 37 of the machine may pass. The depending portion of member 36 is turned upwardly as at 38, thus forming a hook within which the main supporting member 33 may be received. The free end of the last named member is bent outwardly to clear the hand wheel 14, and is provided with ears 39 and 40, adapted to receive a pin 17' upon which the motor 15 may be mounted by lugs 16'. In this modification of the invention the spring 19' for swinging the motor is coiled about the pin 17' with one end 20' hooked over the top of the supporting member 33 and the other end 21' in engagement with the motor.

For controlling the position of the motor there is provided a lever 24' similar in construction to the lever employed in connection with the other modifications of the invention, and adapted to be connected to the treadle by means of a rod 41 adjustably attached to a rod 27' leading to the treadle. The motor may be provided with a brake 31' for checking the speed of the machine when the driving belt 22' is slackened. In the arrangement shown in Figs. 5 and 6 power is transmitted from the motor by means of a driving belt, but the apparatus may be arranged to support the motor in such a position that a friction pulley on its shaft may be brought into engagement with the hand wheel of the machine. In this case the motor will be arranged to swing toward the machine under the influence of the spring 19' in order to hold the friction pulley against the hand wheel.

The invention thus provides a motor drive for sewing machines which is of simple construction and eliminates the use of delicate and expensive instruments such as rheostats for controlling the speed of the motor. On account of the spring associated with the motor the latter will be positively held in operative relation to the machine under all conditions and variations in the speed of the machine due to the effect of centrifugal force will be eliminated.

The arrangement also provides that under normal conditions of operation the machine

shall be driven at maximum speed so that the efficiency of the operator is not lessened. It is, however, possible to produce changes in the speed of the machine by shifting the position of the motor, but such changes require that the operator hold the treadle in an intermediate position, which is not only less convenient but renders it more difficult to maintain a constant speed of the machine. In other words, the usual condition of the machine will be either one in which the effect of the spring associated with the motor will be overcome so that the motor will be held entirely out of operative relation to the machine but with the brake in engagement with the hand wheel of the machine, or one in which the motor will be held in operative relation to the machine by the effect of the spring associated therewith independently of the opposing effect of the treadle spring, in which case the brake will be out of engagement with the hand wheel. It is possible, however, to produce a third condition in which the motor occupies such a position that it is held in operative relation to the machine under the balanced effect of the spring associated with the motor and the force exerted by the treadle spring.

The apparatus may be conveniently applied to all types of sewing machines either by mounting it upon the table of the machine or by mounting it upon a bracket attached to the frame of the machine, and in either case it is equally adapted for a friction drive or a belt drive.

While certain preferable embodiments of the invention have been shown and described it will be understood that various changes in the details of construction may be made without departing from the principle of the invention as defined in the appended claims.

I claim:—

1. In a sewing machine provided with a driving wheel, the combination of a motor mounted to swing about an axis adjacent to the wheel, a spring for holding the motor in operative relation to the wheel of the machine, and means for overcoming the effect of the holding spring to take the motor out of operative relation to the wheel of the machine.

2. In a sewing machine provided with a driving wheel, the combination of a motor mounted to swing about an axis adjacent to the wheel, a spring for holding the motor in operative relation to the wheel of the machine, and means for taking the motor out of operative relation to the wheel of the machine and having a lost motion connection with the motor to permit the latter to assume its operative relation to the wheel of the machine unaffected by said means.

3. In a sewing machine provided with a driving wheel, the combination of a motor

mounted to swing about an axis adjacent to the wheel, a spring for holding the motor in operative relation to the wheel of the machine, and spring actuated means for overcoming the effect of the first named spring to take the motor out of operative relation to the wheel of the machine.

4. In a sewing machine provided with a driving wheel, the combination of a motor mounted to swing about an axis adjacent to the wheel, a spring for holding the motor in operative relation to the wheel of the machine, a second spring and means whereby the second spring may overcome the effect of the first spring to take the motor out of operative relation to the wheel of the machine.

5. In a sewing machine provided with a driving wheel, the combination of a motor mounted to swing about an axis adjacent to the wheel, a spring for holding the motor in operative relation to the wheel of the machine, a second spring and means whereby the second spring may overcome the effect of the first spring to take the motor out of operative relation to the wheel of the machine, said means having a lost motion connection with the motor to permit the latter to assume its operative relation to the wheel of the machine unaffected by said means when the effect of the second spring is overcome by the operator.

6. In a sewing machine provided with a driving wheel, the combination of a supporting member positioned adjacent to the driving wheel, a motor pivotally mounted on the supporting member, a spring for holding the motor in operative relation to the wheel of the machine, a swinging member, a lost motion connection between the motor and the swinging member, means for actuating the swinging member to overcome the effect of the spring and move the motor out of operative relation to the driving wheel of the machine, said means being adapted to be overcome by the operator to release the connection sufficiently to permit the motor to be held in operative relation to the driving wheel of the machine by the spring independently of the effect of the actuating means.

7. In a sewing machine provided with a driving wheel, the combination of a supporting member positioned adjacent to the driving wheel, a pivot pin on the supporting member, a motor provided with lugs mounted on the pin, a spring coiled about the pin with one end attached to the supporting member and the other end in engagement with the motor, said spring being wound to hold the motor in operative relation to the wheel of the machine, spring means for overcoming the effect of the spring to take the motor out of operative relation to the wheel of the machine, and

pedal supported means for controlling the action of said spring means.

8. The combination as claimed in claim 1, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

9. The combination as claimed in claim 2, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

10. The combination as claimed in claim 3, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

11. The combination as claimed in claim 4, in combination with braking means attached to the motor for acting on the driv-

ing wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

12. The combination as claimed in claim 5, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

13. The combination as claimed in claim 6, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

14. The combination as claimed in claim 7, in combination with braking means attached to the motor for acting on the driving wheel of the machine for stopping said driving wheel when the motor is out of operative relation with the driving wheel.

In testimony whereof I affix my signature.

HYMAN MAIMIN.