

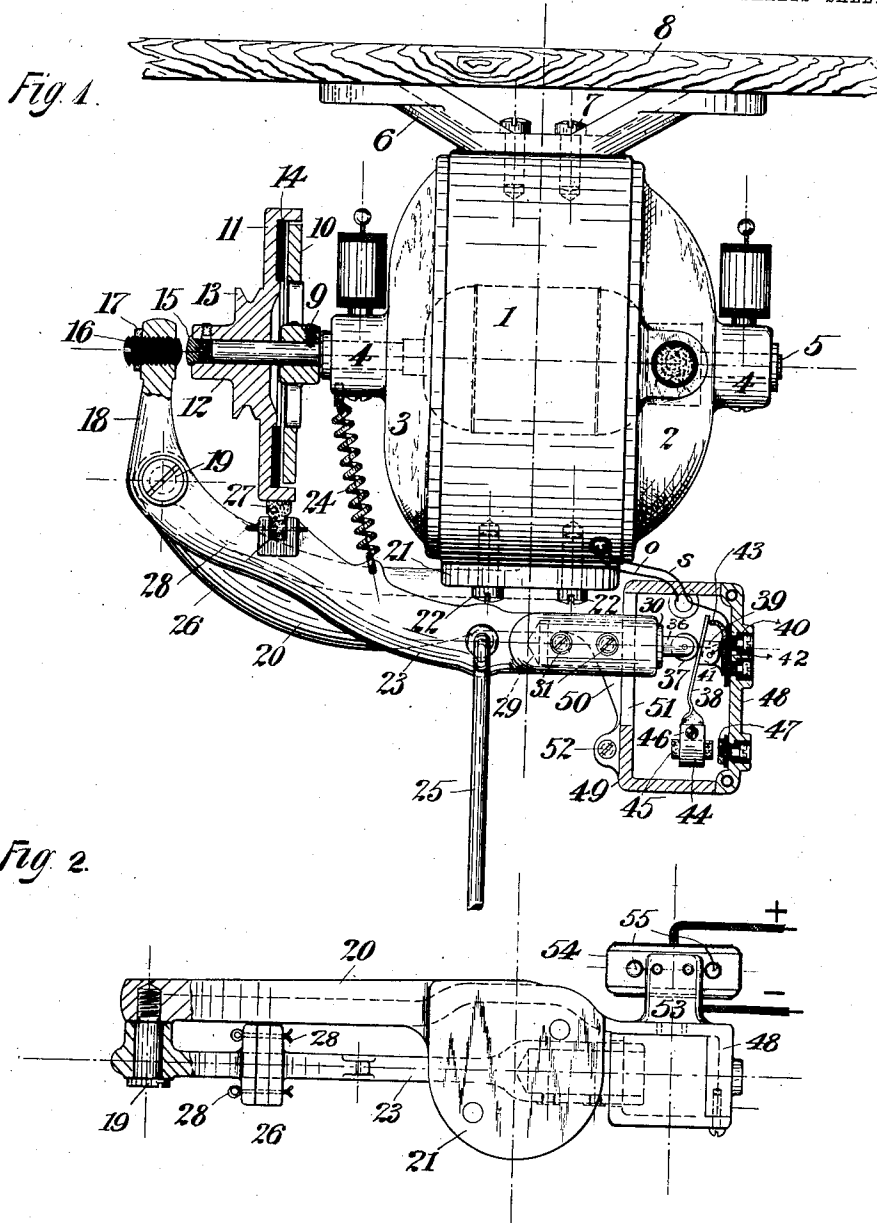
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PATENTED MAY 21, 1907.

G. C. MARX.
ELECTRICAL DRIVING MECHANISM.

APPLICATION FILED JAN. 11, 1906.

2 SHEETS—SHEET 1.



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Fig. 3.

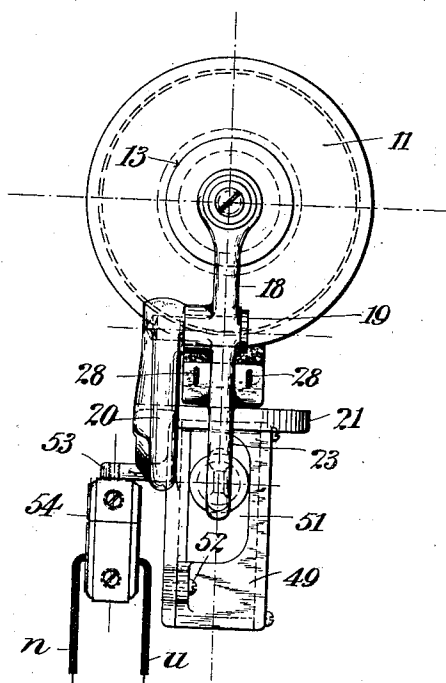


Fig. 7.

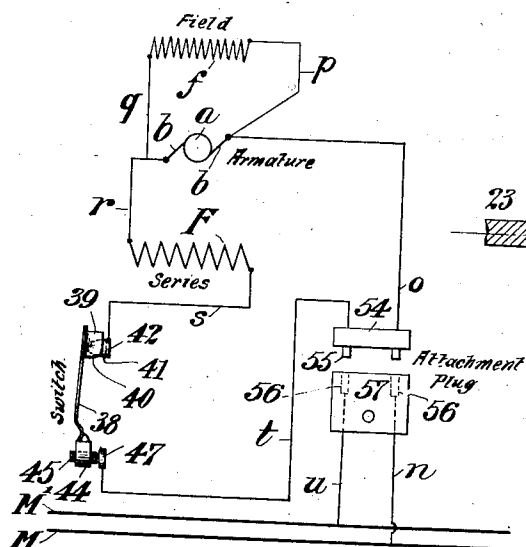


Fig. 5.

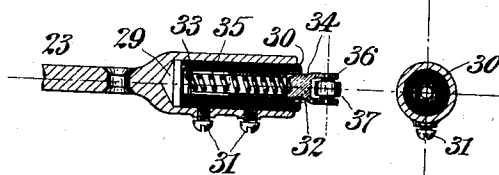
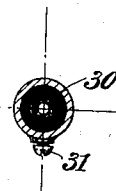


Fig. 6.



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ELECTRICAL DRIVING MECHANISM.

No. 854,050.

Specification of Letters Patent.

Patented May 21, 1907.

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To all whom it may concern:

Be it known that I, GUSTAVE C. MARX, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electrical Driving Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates more particularly to an improvement in that class of driving mechanism for sewing machines and other light machinery in which a single movement on the part of the operator or attendant causes the starting of the motor and the coupling of the same to the machine to be driven; and its chief object is to provide apparatus of this character which is self-contained and thus capable of assemblage of its parts and subsequent test without requiring the disconnection of its constituent members for shipment and their subsequent reassemblage for installation in connection with the machine to be driven thereby.

In its preferred form, the improvement comprises a motor whose frame carries the usual rotary armature to whose shaft is positively connected one of the component members of a clutch device, whose other member is adapted to be brought into and maintained in operative relation therewith by means of an operating lever mounted upon a fixed fulcrum connected with and maintained in fixed relation with the motor frame and having an arm provided with a brake device for engagement with the driven member of the clutch and with means for operating a switch lever mounted within a suitable casing also permanently attached to the motor frame.

The invention also includes certain details of construction of the device.

The invention will be understood by reference to the accompanying drawings, in which

Figure 1 is a side elevation of the motor and its connections representing the clutch and the switch casing in section. Fig. 2 is a plan of the bracket carrying the operating lever fulcrum and the switch casing, with the operating lever applied thereto. Fig. 3 is an end view of the device with the motor frame omitted. Fig. 4 is a diagram representing the electrical connections of the several parts, Fig. 5 is a longitudinal section of the yielding contact plug and its connection

with the rearward end of the operating lever, 55 and Fig. 6 a transverse section of the same.

The motor frame is shown composed of a cylindrical body portion 1 and end caps 2 and 3 each provided with a bearing boss 4 in which is journaled the rotary armature shaft 5, the body portion of the motor frame being provided with a foot piece 6 attached thereto by means of the screws 7 to enable it to be secured to the bottom of a sewing machine or other work-table or support 8. Upon one end of the armature shaft 5 is secured, by means of the set-screw 9, the hub of the fixed member 10 of a friction clutch, shown herein as a flat disk, which is embraced by the recessed operative face of the driven clutch member 11 whose hub 12 is fitted loosely upon the armature shaft 5 and is provided with a grooved belt wheel 13 adapted to be connected by means of a suitable belt with a similar wheel upon the main shaft of the machine to be driven. The driven clutch member 11 is shown herein provided with the usual facing 14 of leather or other suitable material.

A button 15 is applied to the end of the hub 12 to serve as a wearing piece for engagement with the inner operative end of an adjustable contact screw 16 applied to a suitably threaded hole and maintained in suitable adjustment by means of a jam nut 17 in the upper end of the short upright arm 18 of an operating lever fulcrumed upon a stud-screw 19 carried by a bracket-arm 20 extending laterally from a foot piece 21 connected by screw-bolts 22 with the lower side of the motor frame portion 1; the longer arm 23 of the operating lever being maintained normally in its raised inoperative position by means of a spring 24 interposed between the same and one of the motor shaft bearings 4 and adapted to be depressed to shift such lever into operative position by means of a treadle rod 25 in a manner well-known.

The lever-arm 23 is provided adjacent the rim of the clutch member 11 with a transverse socket 26 to receive the lower edge of a brake shoe 27 preferably formed of leather removably secured therein by means of split pins 28, and therefore capable of renewal from time to time as the same becomes worn by engagement with the rim of the clutch member 11. The rearward end of the lever-arm 23 is provided with a socket 29 provided

with an insulating bushing 30, secured in place by the fastening screws 31, into which is driven the metallic bushing 32 having a preferably square socket provided with the thrust-pin 33 between which and the opposite end of a longitudinal socket in the plug 34 is interposed a spring 35 adapted to press rearwardly the said plug, which is provided at its outer end with ears 36 embracing the anti-friction roller 37 adapted to bear upon the switch lever 38 provided with a lateral lug 39 pivoted by means of a pin 40 to bearing ears 41 upon the contact plate 42 with upturned stop-lug 43 adapted to engage the upper end of the switch lever 38.

The switch lever 38 is shown herein formed of sheet metal with a spring socket 44 at its lower end in which is clamped the carbon contact block 45 by means of the clamp-screw 46, such contact block being adapted to make and break electrical connection between the contact plate 42 and the stud 47 through the switch lever 38.

The contact plate 42 and contact stud 47 are each mounted upon and suitably insulated from one of the side walls of a casing comprising the fixed portion 48 carried by a bracket 50 extending laterally from the foot-piece 21 and a removable cap-piece 49 having one of its angularly disposed walls provided with an opening 51 adapted to receive the rearward socketed end of the lever-arm 23 for which its side edges form guides for the vertical movement and its upper and lower ends form stops to determine the degree of movement of the lever-arm 23 to and from operative position. The removable cap-piece is secured to the body of the switch-box by means of the screws 52.

The fixed portion 48 of the switch-box is provided with a lateral lug 53 to which is attached by suitable means the fixed part 54 of an attachment plug provided with the contact pins 55 adapted to enter sockets 56 in the removable portion 57 of the attachment plug. The electrical connections between the several members are represented diagrammatically in Fig. 4 in connection with a compound motor, but it is evident that the improvement is not restricted to employment with any particular type of motor. As indicated in Fig. 4, current enters from one of the mains M and branch wire *n* to the attachment plug socket 56, and passes thence through the contact pin 55 and line *o* to one of the motor brushes *b*, where it divides and a portion passes through the armature to the other motor brush *b* while the remainder passes through the wire *p*, shunt field *f*, and wire *q* to the wire *r* leading from the second brush *b*, thence through the series coils F of the motor field and wire *s* to the contact plate 42. From the contact plate 42, when the switch is closed, it passes through the supporting ears 41, lug 39, lever 38 and contact

block 45 to the stud 47, from which it passes through the connecting wire *t* to the second attachment plug pin 55 and thence through the socket 56 and connecting wire *u* to the second main M'.

In the operation of the device, the several members remain normally in the relative positions represented in Figs. 1 and 4, the brake shoe 27 resting in engagement with the rim of the clutch member 11 under the action of the spring 24, the lateral pressure of the arm 18 of the operating lever upon such clutch member being relieved, and the roller 37 resting in contact with the switch-lever 38 at a point slightly above its pivotal pin 40 to maintain the lever in retracted position with its upper or tail portion resting against the stop-lug 43 of the contact plate 42 so as to interrupt the contact of the contact block 45 with the stud 47. The removable portion 57 of the attachment plug is also detached from the fixed portion 54, whereby current is entirely cut off from the system. When it is desired to establish operative conditions in the apparatus, the part 57 of the attachment plug is brought into operative relation with the part 54, after which the device may be operated by the mere depression and release of the treadle rod 25. The depression of the treadle rod operates first to disengage the brake shoe 27 from the rim of the clutch member 11, then to carry the roller 37 over the fulcrum pin 40 of the switch-lever 38 to instantaneously throw the motor into the circuit to start the same, and finally to bring the contact screw 16 into engagement with the button 15 and thereby press the loose clutch member 11 into operative engagement with the fixed clutch member 10 to establish driving relation between such members and cause the operation of the machine connected with the belt wheel 13. The release of the treadle rod 25 effects the actuation of these parts in the reverse order, by first relieving the pressure and hence interrupting the driving relation between the clutch parts, then cutting the motor out of the power circuit and finally applying the brake shoe 27 to the clutch member 11 to stop the driven machine.

One of the advantages of the common operating lever for the several parts to be actuated is that the timing of the several operations remains fixed under all conditions and cannot be disarranged by the operator. By the employment of the yielding pressure device at the end of the long arm of the operating lever I am enabled to employ a sufficiently strong spring to insure an efficient contact relation between the contact block 45 and stud 47 under running conditions, while such parts are instantaneously thrown into and out of contact relation so as to insure against arcing with the least possible shock, by reason of the exceedingly short leverage of the

spring pressure as the roller passes over the pivotal pin 40 in effecting such shifting of the switch-lever.

The essential feature of this improvement is obviously the permanent connection of the several operative ports with the motor frame, whereby a single assemblage of the component members of the device for test at the factory where the same is constructed is all that is required before actual use by the purchaser, as the entire structure is adapted to be shipped with even the wire connections between the motor, the switch and the attachment plug in operative position as well as the other mechanical parts. The only operations, therefore, required in installing the motor with its controlling devices is to bolt it to the machine table or other support and connect the terminal wires from the mains with the sockets 56 of the removable attachment plug member 57, which can be readily accomplished by any salesman of the machine to be operated without any electrical training, with the assurance that the several devices will operate in the most effective manner without requiring any adjustment whatever other than those due to wear after long use.

It is evident that the device, as set forth in the foregoing description, is susceptible of material modification without departure from the essence of the invention as indicated above.

Having thus set forth the nature of the invention, what I claim herein is,—

1. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled therein, an armature mounted upon said shaft, a clutch including a driving and a driven member mounted for relative movement toward and from each other, the one connected to rotate with said shaft and the other rotatable independently thereof, and an operating lever mounted upon a fixed fulcrum carried by said motor frame and having an operative member disposed substantially in the plane of said shaft and adapted to force one of said clutch members into operative engagement with the other clutch member.

2. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled therein, an armature mounted upon said shaft, a clutch including a driving and a driven member mounted for relative movement toward and from each other, the one connected to rotate with said shaft and the other rotatable independently thereof, a two-armed angle-lever mounted intermediate its arms upon a fixed fulcrum carried by said motor frame and having said arms disposed in substantially the plane of said shaft and one of its arms adapted to ef-

fect the operative engagement of the driving with the driven member of the clutch, and a brake-shoe carried by the other arm of said lever and adapted to operatively engage the driven member of said clutch when the first-named arm is retracted.

3. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled in said bearings, an armature mounted upon said shaft, a clutch including a driving and a driven member of which the former is fixed upon said armature shaft and the latter is disposed at the end of said shaft upon the side of said fixed clutch member opposite the armature and is movable endwise in respect thereof; a bracket-arm carried by said motor frame and extending therefrom in a direction substantially longitudinally of said shaft, a fixed fulcrum-pin carried by said bracket-arm, and an operating lever mounted upon said fulcrum-pin and disposed in substantially the plane of said shaft and having one arm adapted to force the movable clutch member into operative engagement with the fixed clutch member and another arm by which the same is operated.

4. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled in said bearings, an armature mounted upon said shaft, a clutch including a driving and a driven member disposed upon and relatively movable in the axial line of said shaft, and one of which members has a positive connection with said armature shaft, a fixed fulcrum-pin carried by said motor frame, an operating lever mounted upon said fulcrum-pin and having an arm adapted to engage the movable clutch member for forcing it into operative relation with the other clutch member and an actuating-arm by which the same may be operated, and a brake device carried by the actuating arm of said lever and adapted for operative engagement with the driven member of said clutch.

5. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled in said bearings, a clutch including a driving and a driven member one of which has a positive connection with said armature shaft, a switch carried by the motor frame comprising a swinging lever mounted intermediate the ends upon a fulcrum-pin and adapted to make and break electrical connection between two fixed contact points, electrical connections between said switch and the motor, an operating lever mounted upon a fixed fulcrum carried by said motor frame and having a plurality of arms one of which is adapted to move said clutch members into operative engagement, and a spring-pressed plug carried by another arm of said operating lever and adapted in the

movement of the latter to maintain permanent contact with the switch-lever and to tilt the same alternately into operative and inoperative position in passing over said fulcrum-pin.

6. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature journaled in said bearings, a clutch including a driving and a driven member one of which has a positive connection with said armature shaft, a bracket rigidly attached to said motor frame and having a laterally-projecting arm and a switch-casing provided with a lateral opening, a switch inclosed within said casing and comprising a swinging lever mounted intermediate the ends upon a fulcrum-pin and adapted to make and break electrical connection between two fixed contact points also inclosed within said casing, and an operating lever mounted upon a fixed fulcrum carried by the lateral arm of the motor frame bracket and having one arm extended adjacent the motor-shaft and adapted to move said clutch members into operative engagement and another arm extended through the lateral aperture of the switch-casing and into operative relation with said switch-lever.

7. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature journaled in said bearings, a clutch including a driving and a driven member one of which has a positive connection with said armature shaft, a bracket rigidly attached to said motor frame and having a laterally-projecting arm and a switch-casing provided with a lateral opening, a switch inclosed within said casing and comprising a swinging lever mounted intermediate the ends upon a fulcrum-pin and adapted to make and break electrical connection between two fixed contact points also inclosed within said casing, and an operating lever mounted upon a fixed fulcrum carried by the lateral arm of the motor frame bracket and having one arm extended adjacent the motor-shaft and adapted

ed to move said clutch members into operative engagement and another arm extended through the lateral aperture of the switch-casing and into operative relation with said switch-lever, the said lateral opening in the switch-casing having parallel side edges spaced apart to correspond with the width of and to guide the adjacent end of the operating lever in its movements and having such length as to enable its ends to serve as stops for said lever in the extreme positions of the latter.

8. The driving mechanism comprising an electric motor constructed with a frame provided with bearings and having an armature shaft journaled in said bearings, a clutch including a driving and a driven member one of which has a positive connection with said armature shaft, a switch carried by the motor frame comprising a swinging lever mounted intermediate the ends upon a fulcrum-pin and adapted to make and break electrical connection between two fixed contact points, electrical connections between said switch and the motor, an operating lever mounted upon a fixed fulcrum adjacent said clutch and having a shorter arm adapted to move the clutch members into operative relation and a longer arm provided with a spring-pressed plug adapted to maintain permanent contact relation with the switch-lever and move longitudinally thereof over its fulcrum-pin to tilt the same into and out of operative position, a spring applied to the longer arm of said lever to maintain it normally in inoperative position, and means also applied to the longer arm of said lever for shifting the same in opposition to said spring to successively actuate said switch and clutch.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GUSTAVE C. MARX.

Witnesses:

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HENRY A. KORNEMANN.