No. 628,014. Patented July 4, 1899.

C. R. MESTON.

ATTACHMENT FOR ELECTRIC MOTORS.

(Application filed Nov. 28, 1898.)

(No Model.) 2 Sheets—Sheet 1.

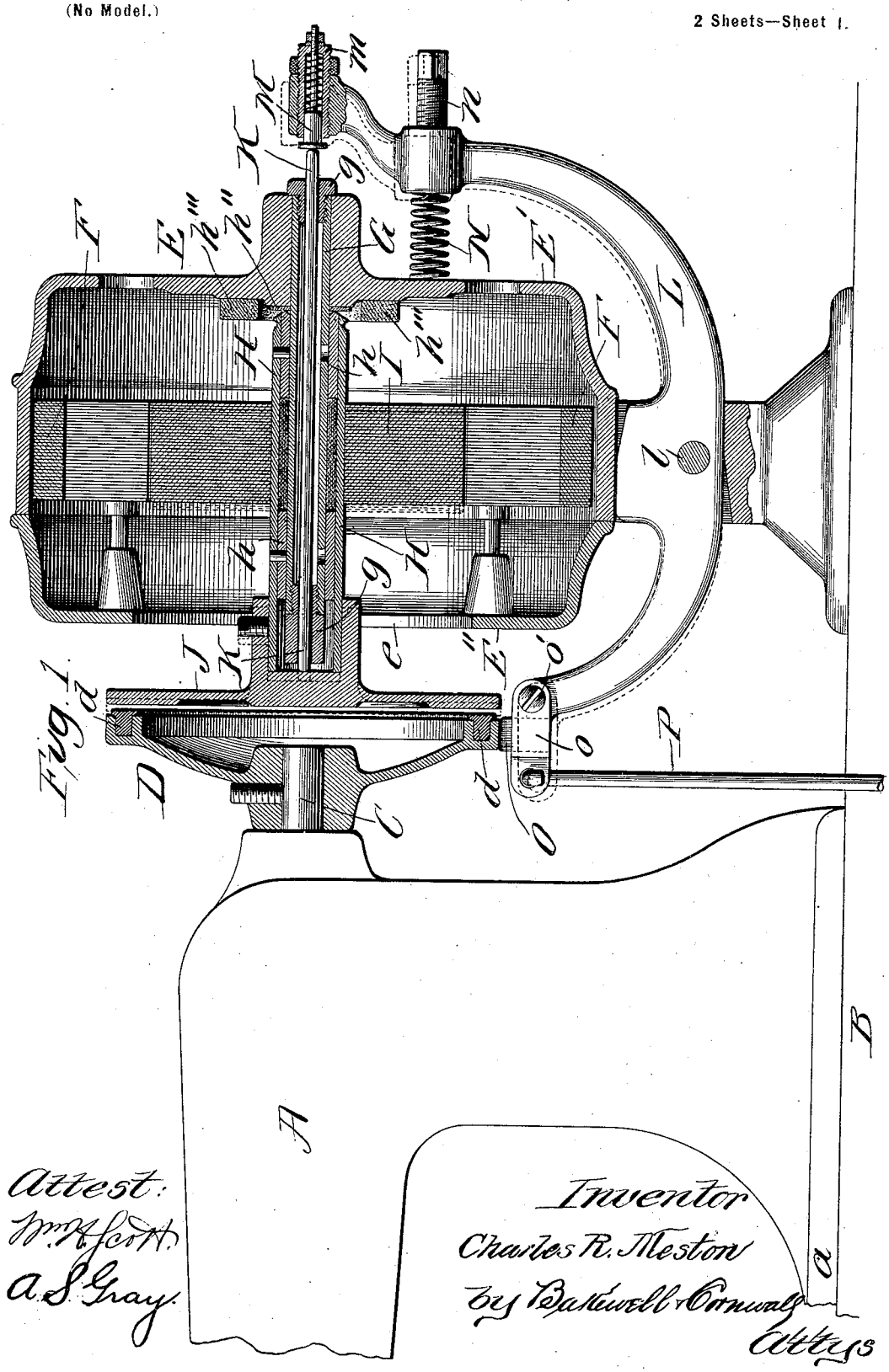

Fig. 1.

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Fig. 2.

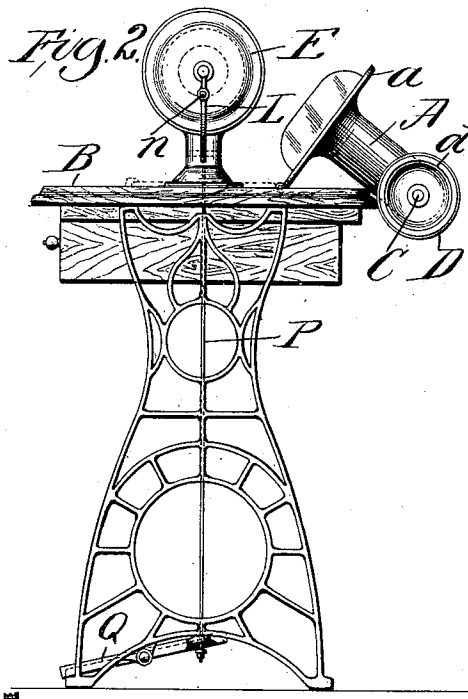


Fig. 3.

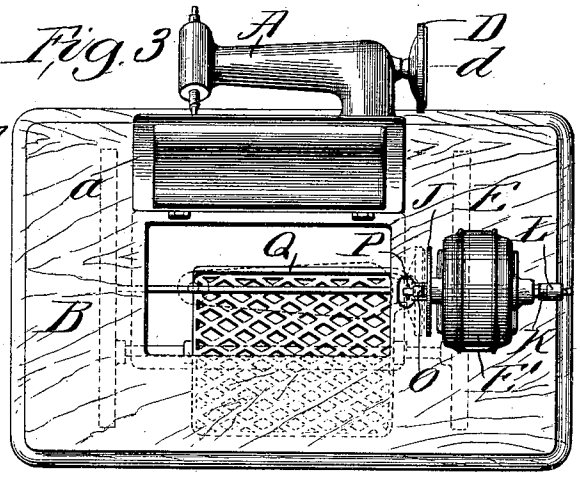
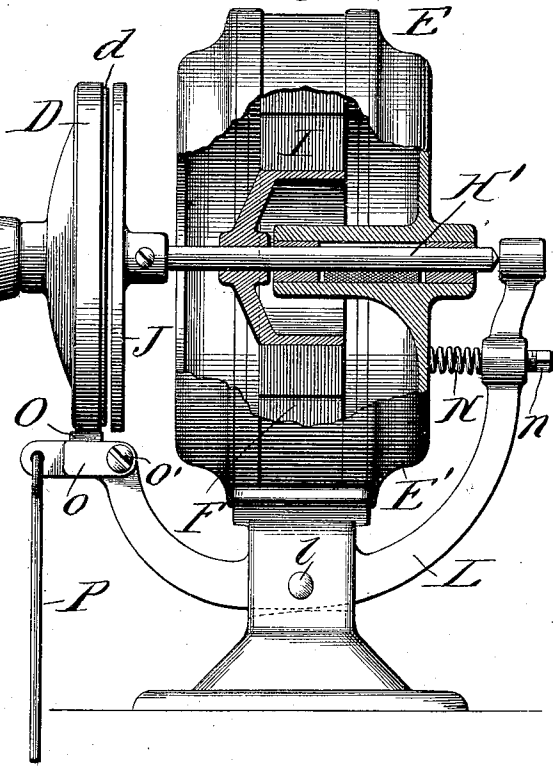


Fig. 5.



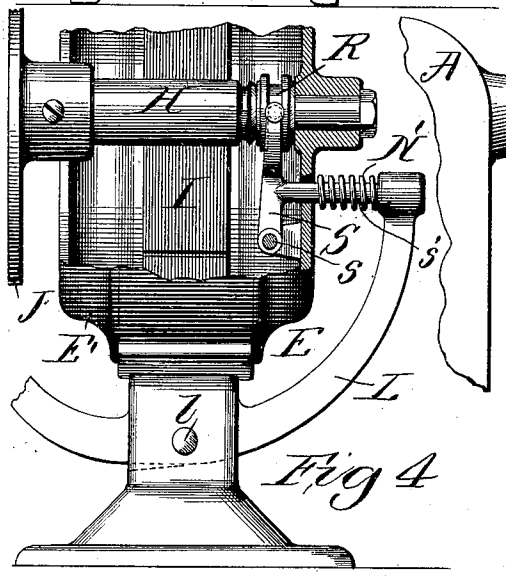
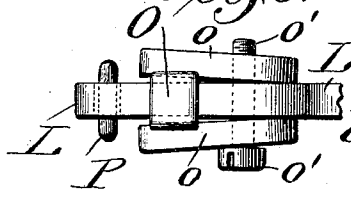


Fig 4

Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES R. MESTON, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO THE EMERSON ELECTRIC MANUFACTURING COMPANY, OF SAME PLACE.

ATTACHMENT FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 628,014, dated July 4, 1899.

Application filed November 28, 1898. Serial No. 697,651. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. MESTON, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Attachments for Electric Motors, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional view through a motor, showing the relation of my attachments thereto. Fig. 2 is a view in side elevation showing the manner of arranging a motor to operate a sewing-machine. Fig. 3 is a top plan view of the same, the sewing-machine being thrown back, so as to permit the armature of the motor to be withdrawn. Fig. 4 is a partial sectional view illustrating a slightly-modified form of my improved attachment. Fig. 5 is a similar view showing another modified form of my attachment; and Fig. 6 is a detail view, in top plan, showing the manner in which the brake-shoe is secured to the lever.

This invention relates to a new and useful improvement in attachments to electric motors, the object being to provide means whereby said motor may be direct-acting with relation to the shaft to be driven.

I am aware that motors have been extensively employed in different ways to drive machinery in which a counter-shaft has been employed or clutch interposed between the armature-shaft and the shaft to be driven or the armature-shaft has been made the main driving-shaft of the machinery.

The prime object in view with this present invention is to simplify the method of driving a shaft of a piece of machinery, and, further, to provide means whereby the armature-shaft may be coupled to the driving-shaft, so that said driven shaft will immediately start off at full speed, and when the armature-shaft is disengaged from the driven shaft the driven shaft is braked, so as to cause it to stop immediately. These conditions apply particularly with relation to a sewing-machine, which is the machinery driven by the motor illustrated in the drawings; but it is of course understood that other conditions may arise which may require a modification of the details of construction to meet the new conditions. It will be further understood that while I have illustrated a sewing-machine in the drawings as the machinery driven by the motor, yet I wish to be distinctly understood as not confining the application of my invention to this particular machine, as there are many other machines to which my invention can be applied with equal facility, such as pumps or bellows for organs, small lathes, and the like.

The essential features of this present invention reside in the arrangement of a friction disk or clutch on the shaft to be driven, with which coöperates a friction disk or clutch driven by the armature-shaft.

Another feature resides in the novel means employed for laterally displacing the armature, its shaft, and associate parts, whereby the friction-disk carried by the armature-shaft is thrown into engagement with its companion on the shaft to be driven.

Another feature resides in the novel means of disengaging the friction-disks from each other, which consists in moving the armature, its shaft, and associate parts laterally when the armature-shaft is released by the magnetism of the field-magnets.

Another feature of the invention resides in the novel means employed for moving the armature and its associate parts laterally, so that the friction-disk carried thereby will engage its companion, said means simultaneously releasing the companion disk on the shaft to be driven, and, finally, the invention consists in the construction, arrangement, and combination of the several parts, as will hereinafter be described and afterward pointed out in the claims.

In the drawings, A represents a sewing-machine head mounted upon its base *a*, said base being preferably hinged on its rear edge to a table or stand B, as is usual.

C represents the main shaft of the sewing-machine or the shaft to be driven, on which is fixed a friction-disk D, its side face being

preferably grooved for receiving a leather or fibrous ring *d*, which projects laterally beyond the side face of the disk. If desired, it will of course be understood that disk D need not be mounted directly upon the main shaft of the sewing-machine; but said disk can be mounted on a counter-shaft and have conjoined thereto a pulley, around which would run the usual round belt, and in that manner the driven shaft can be belted to the sewing-machine, which would not necessitate the removing of the hand-wheel from said machine, as will be well understood.

E represents an electric motor preferably arranged in axial alinement with the shaft to be driven, which position is illustrated in the drawings as being directly back of the sewing-machine head. This motor may be of any usual and well-known construction and may be run either by alternating or straight currents, as best adapted to requirements. The motor shown in the drawings is adapted to be run by an alternating current, and consists of suitable casing E′, which supports the laminated field-magnet cores F, the windings of said field-magnets not being shown. A removable face-plate E″ may also be provided to give a finished appearance to the casing, and by preference this face-plate is formed with a central aperture or opening *e* of such diameter as to permit the insertion and withdrawal of the armature therethrough.

As shown in Fig. 1, casing E′ has a fixed hollow shaft G mounted therein for containing a suitable lubricant, the ends of said hollow shaft receiving suitable plugs *g*, in which is slidingly mounted a rod, which will hereinafter be described.

H indicates a sleeve carrying bushings *h*, which are bored for the fixed shaft and which form bearings for said sleeve. The inner end of sleeve H is preferably formed with an annular knife-edge, which normally bears against a washer *h*″ to prevent the escape of the lubricant into the motor. An absorbent ring *h*‴ surrounds the washer *d*″ for the purpose of catching and absorbing any lubricant which might escape.

I is the laminated core of the armature, which is mounted on sleeve H. The type of motor shown being what is commonly known as an "induction-motor" does not need any but closed windings in the armature, and therefore no commutator or brushes are shown. The copper bars, which are arranged in the periphery of the armature, are indicated by dotted lines and are short-circuited by a copper ring at each side of the armature, all of which is well understood.

J indicates the friction-disk, which is mounted on the outer end of sleeve H in such a position that when the armature and its associate parts are moved laterally said friction-disk will contact with its companion and drive the latter.

K indicates a rod or bar which is slidingly mounted in the plugs *g*, one end of which bears against the hub portion of the disk J, while its rear end projects outwardly and is engaged by the upper end of a lever L, which is preferably pivoted at *l* to the motor-standard. In order to make the end thrust against the rod K yielding, I preferably mount a spring-pressed thimble M in the upper end of lever L, which thimble bears against rod K, and when lever L is moved so as to force the disk J into engagement with its companion thimble L will yield sufficiently to permit a slight further movement of the lever L. This is desirable, as the yielding thimble M may be adjusted by the set-screw *m*, and thus compensate for any inequalities in the manufacture of the motor or its parts.

Lever L is normally held in its outer position through the instrumentality of a compression-spring N, whose tension may be regulated by the set-screw *n*. It is of course understood that a weight would accomplish the same purpose.

The inner end of lever L carries the brake-shoe O, which may be of leather or other suitable material and which, as shown in Fig. 6, is bent over the inner end of said lever and clamped in position by two clamping-plates *o*, which are held in place by a screw *o*′.

In the event that it is desired to control the rotation of the driven shaft by the foot I attach a rod P to the inner end of lever L and connect said rod to the treadle Q of the sewing-machine. When the rod P is depressed, it moves the lever L on its pivot, so as to disengage the brake-shoe O from the friction-disk D and cause the outer end of said lever to engage rod K and force the same inwardly, which results in the engagement of the friction-disk J with its companion and the lateral displacement of the armature relative to the field-magnets. The shaft to be driven may be controlled in its speed by increasing or diminishing the pressure of friction-disk J. As the motor is designed to run continuously at a suitable speed, friction-disk J is constantly rotating, and when rod P is depressed slightly disk J engages its companion under slight pressure, and said companion, meeting with resistance, will permit the disk J to slip thereon, so that in the case of the power being applied to a sewing-machine the needle may be caused to vibrate fast or slow, as desired. When the machine being driven is to be run at full speed, disk J is pressed tightly against its companion, so that the two run practically in unison. When the machine is to be stopped, pressure is relieved from rod P and lever L, and spring N causes the outer end of said lever to move outwardly and the inner end of said lever to move upwardly, which latter carries its brake-shoe into contact with the disk D, causing the machine to cease running. The stoppage of the machine, while materially assisted by the brake-shoe, is in reality dependent upon the disengagement of the live disk J from its companion, and to cause this disengagement I depend on

the magnetism of the field-magnets of the motor for withdrawing the armature back into place, and consequently moving disk J away from its companion. This magnetism I have found can be entirely relied upon to accomplish this disengagement without resort being had to levers, weights, or springs. The lateral displacement of the armature by positive mechanical means and the restoration of the armature to its normal position by magnetism I consider novel, as I am not aware that such has been done heretofore.

While I have shown means for positively effecting lateral displacement of the armature and its carried friction-disk to cause an engagement of the disk with its companion, said armature being subsequently restored to its normal position by magnetism, which disengages the active or live disk from its companion, yet it will be understood that this action can be reversed and magnetism relied upon to effect a longitudinal movement of the armature relative to its shaft to cause the engagement of its disk with its companion, while mechanical means can be resorted to to effect the positive disengagement of disk J from its companion.

In Fig. 4 I have shown a slightly-modified form of my invention, in which a collar R is mounted on the fixed shaft and against which the inner end of sleeve H bears. This collar is engaged by a lever S, pivoted at *s*, and provided with a projection *s'*, which extends through a spring N', corresponding in nature and function to spring N, (shown in Fig. 1,) said projection *s'* being engaged by the outer end of lever L, as heretofore described. The operation of the motor here shown is similar to that described with reference to the construction shown in Fig. 1, the only difference being the substitution of lever S for the rod K.

In Fig. 5 I have shown a construction in which the armature is mounted on a solid shaft H', slidingly mounted in suitable bearings and against which shaft the outer end of lever L bears.

I am aware that many minor changes in the arrangement, construction, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an electric motor which is normally in circuit, of mechanical means for laterally displacing the armature of said motor relative to its field-magnets, the magnetism of said field-magnets being relied upon to restore said armature to its normal position upon the disengagement of said mechanical means therefrom; substantially as described.

2. The combination with an electric motor, in which is included an armature, slidingly mounted on or in its bearings, and means for positively thrusting said armature longitudinally along its bearings, so as to displace the same laterally with reference to its field-magnets; substantially as described.

3. The combination with an electric motor, comprising field-magnets, and an armature whose shaft slides longitudinally, a clutch member carried by said armature-shaft, and positive mechanical means for moving said armature-shaft and its carried parts longitudinally in one direction, the magnetism of the field-magnets restoring said armature to its normal, or free running position; substantially as described.

4. The combination with an electric motor, comprising field-magnets and an armature which is mounted on a longitudinally-movable shaft, of a clutch member carried by said shaft, a companion clutch member mounted on the shaft to be driven, and which is engaged by the motor clutch member, and a lever for moving said armature-shaft and its carried parts longitudinally; substantially as described.

5. The combination with an electric motor, comprising field-magnets, and an armature mounted on a longitudinally-movable shaft, of a clutch-disk mounted on said armature-shaft, a companion clutch-disk, with which said first-mentioned clutch-disk coöperates, a lever for moving said armature-shaft, and its carried parts, said lever also carrying a brake coöperating with the clutch to be driven; substantially as described.

6. The combination with an electric motor, comprising field-magnets, and an armature, which is mounted on a longitudinally-movable shaft, a clutch member carried by said armature-shaft, a lever for moving said shaft longitudinally, yielding means between said lever and said shaft and a driven clutch member coöperating with the clutch member carried by the armature-shaft; substantially as described.

7. The combination with an armature, of an electric motor, which is mounted on a longitudinally-movable shaft, of a clutch-disk carried thereby, a companion disk mounted on the shaft to be driven, and axially in line with the armature-shaft, a lever for positively engaging the armature-shaft for moving the same in one direction, and means for restoring said lever to its normal position; substantially as described.

8. The combination with an electric motor, comprising field-magnets and a laterally-displaceable armature, a clutch member, which is controlled by said armature, a lever for positively displacing said armature in one direction, the magnetism of the field-magnets being relied upon to restore the armature and its associate parts to their normal position, a driven clutch coöperating with the armature-clutch, and a brake coöperating with said driven clutch whenever the armature-clutch is disengaged therefrom; substantially as described.

9. The combination with lever L, of a spring for restoring the same to its normal position, an adjustable spring-pressed plug carried by said lever, and an armature provided with mechanism yieldingly engaged by said spring-pressed plug, whereby when said lever is actuated, said armature is laterally displaced relative to its field-magnets; substantially as described.

10. The combination with a shaft to be driven, of an idle clutch member mounted thereon, a motor, whose armature carries a live clutch member, a lever for positively engaging said live clutch member with its idle companion, a brake-shoe on said lever which coöperates with said idle clutch member, a rod connected to said lever, and a treadle to which said rod is connected; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 21st day of November, 1898.

CHARLES R. MESTON.

Witnesses:
F. R. CORNWALL,
WM. R. SCOTT.