(No Model.) 2 Sheets—Sheet 1.

F. E. DAVIS & J. SCOTT, Jr.

MACHINE FOR COVERING WIRE, &c.

No. 420,777. Patented Feb. 4, 1890.

Fig. 1.

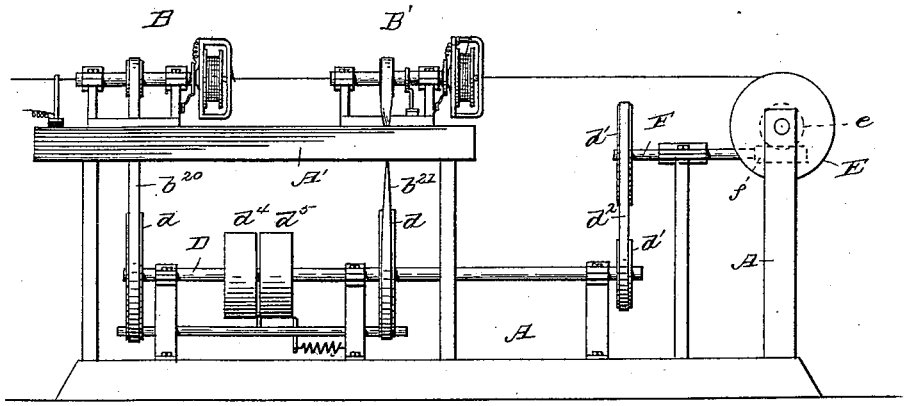


Fig. 2.

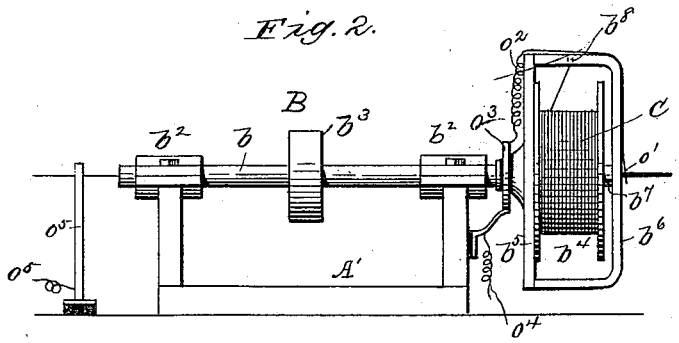


Fig. 2a

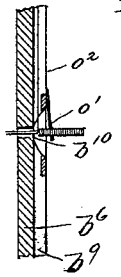


Fig. 3.

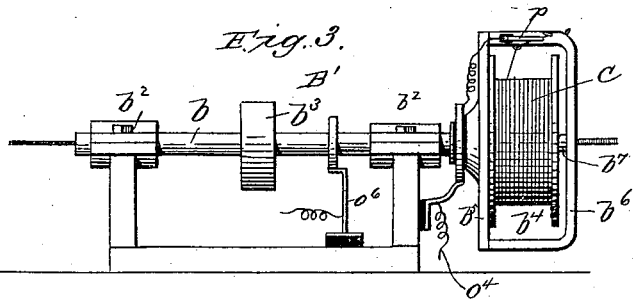
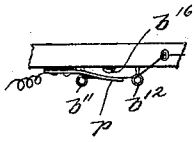


Fig. 3a



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(No Model.) 2 Sheets—Sheet 2.

F. E. DAVIS & J. SCOTT, Jr.

MACHINE FOR COVERING WIRE, &c.

No. 420,777. Patented Feb. 4, 1890.

Fig. 4.

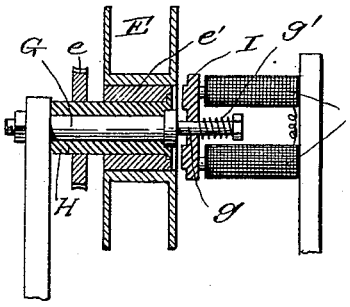


Fig. 5

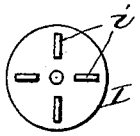


Fig. 6

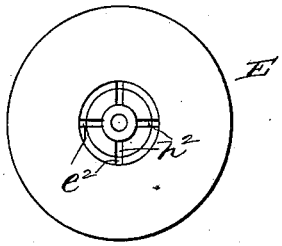


Fig. 7.

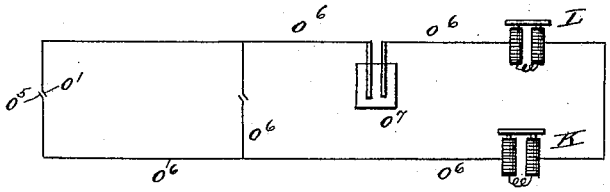


Fig. 8.

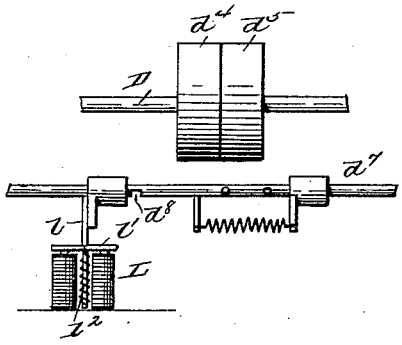


Fig. 9.

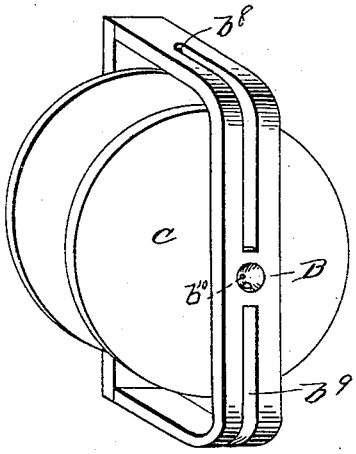
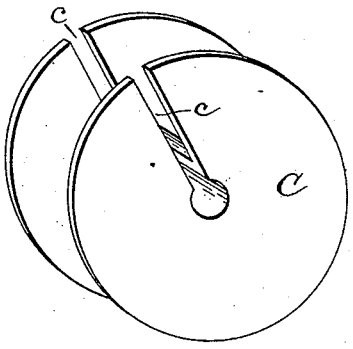


Fig. 10.



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By their Attorneys.

UNITED STATES PATENT OFFICE.

FRANK E. DAVIS, OF BOSTON, AND JOHN SCOTT, JR., OF PLYMOUTH, MASSACHUSETTS.

MACHINE FOR COVERING WIRE, &c.

SPECIFICATION forming part of Letters Patent No. 420,777, dated February 4, 1890.

Application filed July 8, 1889. Serial No. 316,810. (No model.)

To all whom it may concern:

Be it known that we, FRANK E. DAVIS, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, and JOHN SCOTT, Jr., of Plymouth, in the county of Plymouth and Commonwealth aforesaid, have invented a new and useful Improvement in Machines for Covering Wire, &c., of which the following is a specification, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to machines for covering a core of wire, thread, or other material with another wire, thread, or other material, and especially to the devices for stopping the machine immediately upon the breaking or running out of the covering material, or upon the failure of the same to cover the core completely.

The object of the invention is to permit the machine to be run at great speed and at the same time to prevent waste of material, loss of time, and the production of an imperfect article, especially when the machine is used for covering a wire with an insulating material.

In the drawings, in which we have shown convenient embodiments of our invention, Figure 1 is an elevation of a machine to which our improvements are applied. Figs. 2 and 3 are elevations of the winding or covering fliers. Figs. 2^a and 3^a are views presenting details of the same. Fig. 4 is a view, partly in section, of the winding or feed drum and its clutch connections. Figs. 5 and 6 are views representing details of the same. Fig. 7 is a diagram of the electrical connections. Fig. 8 represents a convenient form of belt-shipper and releasing devices, and Figs. 9 and 10 present details of the flier and spool.

Upon a suitable frame-work A are mounted the various parts of the machine.

Upon the bed-piece A′ thereof are supported the covering or wrapping fliers B B′, of which we have shown two, though more than that number or only one may be employed, according to the number of plies or layers with which it is desired to cover the wire or other core. These fliers are of similar and ordinary construction, except as hereinafter pointed out, and a description of the general construction of one will suffice for all.

A hollow shaft b, mounted to rotate in bearings b^2 and provided with a driving-pulley b^3, carries at the end thereof a head or frame b^4, consisting of the stretcher b^5 and the detachable yoke-piece b^6. The head is adapted to carry, preferably upon a hollow spindle b^7, a spool C, containing the material with which the core is to be covered, said spool being mounted to rotate on the spindle with a slight frictional resistance, in order that the thread may be drawn off freely and yet be under a slight tension, for a purpose to be described.

In order to provide a suitable guide for the thread which passes from the spool through an eye b^8 in or on an arm of the yoke-piece and to protect the thread from the rush of air incident to the rapid rotation of the flier, the yoke-piece is formed with a groove b^9, in which the thread lies until it reaches the eye b^{10}, where it is wrapped or wound upon the core. The spools upon which the covering material is wound preferably are slotted from center to circumference, as shown at c, in order that each spool as it is emptied may be removed readily from the machine and from the core.

In commencing to cover a wire we prefer to pass the wire through several of these spools beyond each flier, so that when one spool is emptied and removed another may be put in its place without severing the wire. When two fliers are employed, they are driven, preferably, in opposite directions, and to effect this the flier B may be driven by a straight belt b^{20} and the flier B′ by a crossed belt b^{21} from a driving-shaft D, provided with pulleys d. The core is drawn through the fliers by a feed or winding drum E, which may be driven from the shaft D through pulleys d' d', belt d^2, shaft F, worm f, and worm-wheel e upon the shaft of the drum. It is necessary that the feed be stopped instantly upon the breaking of a covering-thread, and we therefore provide an improved clutch mechanism, whereby the drum may be released instantly and by a slight force from its actuating mechanism.

Upon a stud G, secured to a suitable support, is mounted to rotate a sleeve-shaft H, to which is secured the worm-wheel e. The drum E is mounted loosely upon the sleeve-

shaft H and has the end of its hub e' substantially in the plane of the end of the sleeve-shaft H. The end of said hub and the end of said shaft are formed with registering or corresponding notches or slots h^2 h^2 and e^2 e^2. Opposite the slotted end of the shaft and hub is supported to rotate and to move toward and from said shaft and hub a plate I, formed with projections i, registering or corresponding with and adapted to enter the slots of the hub and shaft, and thereby to lock the drum to the shaft and compel it to rotate therewith, or when moved back to release the drum from said shaft. The plate is supported preferably upon a pin or spindle g, which may be an extension of the stud G and is pressed toward the shaft and drum by a spring g'. Any means may be employed for moving this plate away from the shaft; but we prefer to make the plate the armature of an electro-magnet K, which is energized when the thread or covering material breaks or fails to cover the core completely.

To provide for the stopping of the flier and feed when the thread or covering material breaks or fails, we have found that certain electro-magnetic devices give the best results as to delicacy, certainty, and promptness.

In the case of the flier B, which wraps the first layer upon the core, and when wire is the core, we insulatingly fasten upon the yoke b^6 a contact-point O', which is adapted to rest normally upon the wire just after it has been covered, but which comes in contact with the wire itself when the thread breaks or runs out or fails to cover completely the core. This contact-point is connected by an insulated wire O^2 with an insulated ring-conductor O^3 on the hub of the head, in contact with which is a conductor O^4. A second contact-point O^5 rests upon the bare wire before it reaches the covering-point. From one of these two contact-points to the other extends a conductor O^6, passing through a battery O^7, the magnet K, and a magnet L, whose armature controls a belt-shipper or stopping-lever whereby the driving-power of the machine may be disconnected.

In case of fliers subsequent to the first, when more than one flier is employed, or in case the core is not itself a conductor, it is impracticable to employ contact-points adapted to complete the circuit through the wire, and it becomes necessary to depend upon the tension of the thread or covering material to separate two contact-points, so that upon the failure of the thread the circuit is completed and the magnets energized. Therefore we have provided the devices shown as applied to the flier B'. We insulatingly secure to the yoke a spring contact-point p and connect the same to the insulated ring O^3 by an insulated conductor O^2, as before. The second contact-point, however, is the yoke itself or a point b^{16}, which may be formed thereon. The flier itself then becomes a part of the conductor, and we provide upon the shaft thereof a contact-ring, in contact with which (or, it might be, with the shaft itself) is the end of a conductor O^6, which passes through the battery and magnets as before.

In order that the contact-point p may be kept normally from contact with the yoke, there are provided upon the yoke two guide-eyes b^{11} and b^{12}, by which the thread is caused to hold the spring contact-point away from the yoke so long as the thread remains unbroken.

The belt-shipper or stopping rod or lever controlled by the magnet L may be of any ordinary construction, and we have shown one such form. Upon the shaft D are placed a fast and a loose pulley d^4 d^5, the belt being thrown from the fast to the loose pulley by a spring-actuated shipper-rod d^7, which is held normally against the action of the spring by a finger l, attached to the armature l' of the magnet. The armature and finger are pressed toward the rod by a spring l^2, and the finger engages a notch d^8 in the rod.

What we claim, and desire to secure by Letters Patent, is—

1. In combination, a shaft having its end slotted, a pulley mounted upon said shaft and having one end of its hub substantially in the plane of the end of the shaft and slotted to correspond therewith, a plate having projections adapted to enter the slots of both pulley and shaft, whereby the pulley may be engaged with or disengaged from said shaft, and a support upon which said plate is free to rotate, substantially as shown and described.

2. In combination, a stud, a sleeve-shaft mounted to rotate on said stud and having its end slotted, a pulley mounted upon said shaft and having one end of its hub substantially in the plane of the end of the shaft and slotted to correspond therewith, a plate having projections adapted to enter the slots of both pulley and shaft, whereby the pulley may be engaged with or disengaged from said shaft, and a support upon which said plate is free to rotate, substantially as shown and described.

3. The combination, with an electric circuit, including a generator, a magnet and contact-points normally separated, and means to close the circuit, of a shaft having its end slotted, a pulley mounted thereon having one end of its hub slotted to correspond with the slots of the shaft, a plate having projections adapted to enter the slots of both pulley and shaft, said plate constituting the armature of the magnet, a support upon which said plate is rotatably mounted, and a spring acting normally to press said plate against the end of the shaft and hub and adapted to yield when the circuit is completed and the magnet energized to permit the removal of the projections from the slots and the disen-

gagement of the pulley from the shaft, substantially as shown and described.

4. In a machine for covering wire, &c., the combination, with a flier adapted to carry the covering thread or material, and an electric circuit including a generator, a magnet and contact-points upon the flier adapted to be held apart by the tension of the thread, of an armature for said magnet, driving mechanism, means for disengaging said driving mechanism, and connections therefrom to the armature, whereby on the failure of the thread and the closing of the circuit the armature is attracted and the machine is stopped, substantially as shown and described.

5. In combination, a flier, an insulated conducting-ring carried thereby, an insulating contact-point also carried by said flier and electrically connected with said ring and adapted to be held from contact with the flier by the tension of a thread carried by the flier, a generator, a magnet, electrical connections from the ring to the flier through the generator and the magnet, an armature, mechanism for driving the flier, means for disconnecting said driving mechanism, and connections therefrom to the armature, whereby on the failure of the thread and the closing of the circuit the armature is attracted and the driving mechanism is disconnected, substantially as shown and described.

6. In a machine for covering wire, &c., the combination, with a flier adapted to carry the covering thread or material, and an electric circuit including a generator, a magnet, and contact-points upon the flier adapted to be held apart by the tension of the thread, of a winding-drum, a shaft upon which it is mounted, the ends of the shaft and of the hub of the drum being in substantially the same plane and correspondingly slotted, and a plate rotatably supported and having projections adapted to engage the slots of the drum and its shaft, said plate constituting the armature of the magnet, substantially as shown and described.

7. In a machine for covering wire, a flier adapted to carry the covering thread or material, an electric circuit including a generator, a magnet, and two contact-points, one of which is adapted to rest upon the covered wire and the other upon the bare wire, and an armature in combination with driving mechanism, and means controlled by said armature for disconnecting said driving mechanism, whereby upon failure of the thread to cover the wire completely the circuit is completed through the wire and the machine is stopped, substantially as shown and described.

8. The combination, with means for covering a wire and driving means, of devices providing for throwing the driving means into and out of operation, an electric circuit including a generator, a magnet, and contact-points, one of which is adapted to rest upon the wire after it is covered, and the other to rest upon the bare wire, an armature for the magnet, and means intermediate said armature and said provisions for the engagement and disengagement of the driving means, whereby upon failure of the covering material to cover completely the wire the circuit is completed through the wire and the machine is stopped, substantially as shown and described.

9. In a machine for covering wire, the combination of a flier adapted to carry the thread for covering the wire, a contact-point carried by said flier and adapted to rest upon the covered wire, a second contact-point adapted to rest upon the bare wire, an electric circuit connecting said contact-points and including a generator and a magnet, an armature for said magnet, driving means for said flier, devices providing for throwing said driving means into and out of operation, and devices intermediate said last-named devices and said armature, whereby upon failure of the thread the circuit is completed, the armature attracted, and the machine stopped, substantially as shown and described.

10. In a machine for covering wire, &c., the combination, with a flier adapted to carry the covering thread or material, and an electric circuit including a generator, a magnet, and contact-points upon the flier adapted to be held apart by the tension of the thread, of an armature for said magnet, driving mechanism including fast and loose pulleys, a spring-actuated belt-shifter, and a detent carried by the armature and adapted to engage the shifter and hold the belt upon the fast pulley, whereby on the failure of the thread the armature is attracted and the belt-shifter released, substantially as shown and described.

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