No. 861,097. PATENTED JULY 23, 1907.

L. W. DOWNES.

APPARATUS FOR APPLYING INSULATION TO ELECTRIC CONDUCTORS.

APPLICATION FILED JULY 7, 1904.

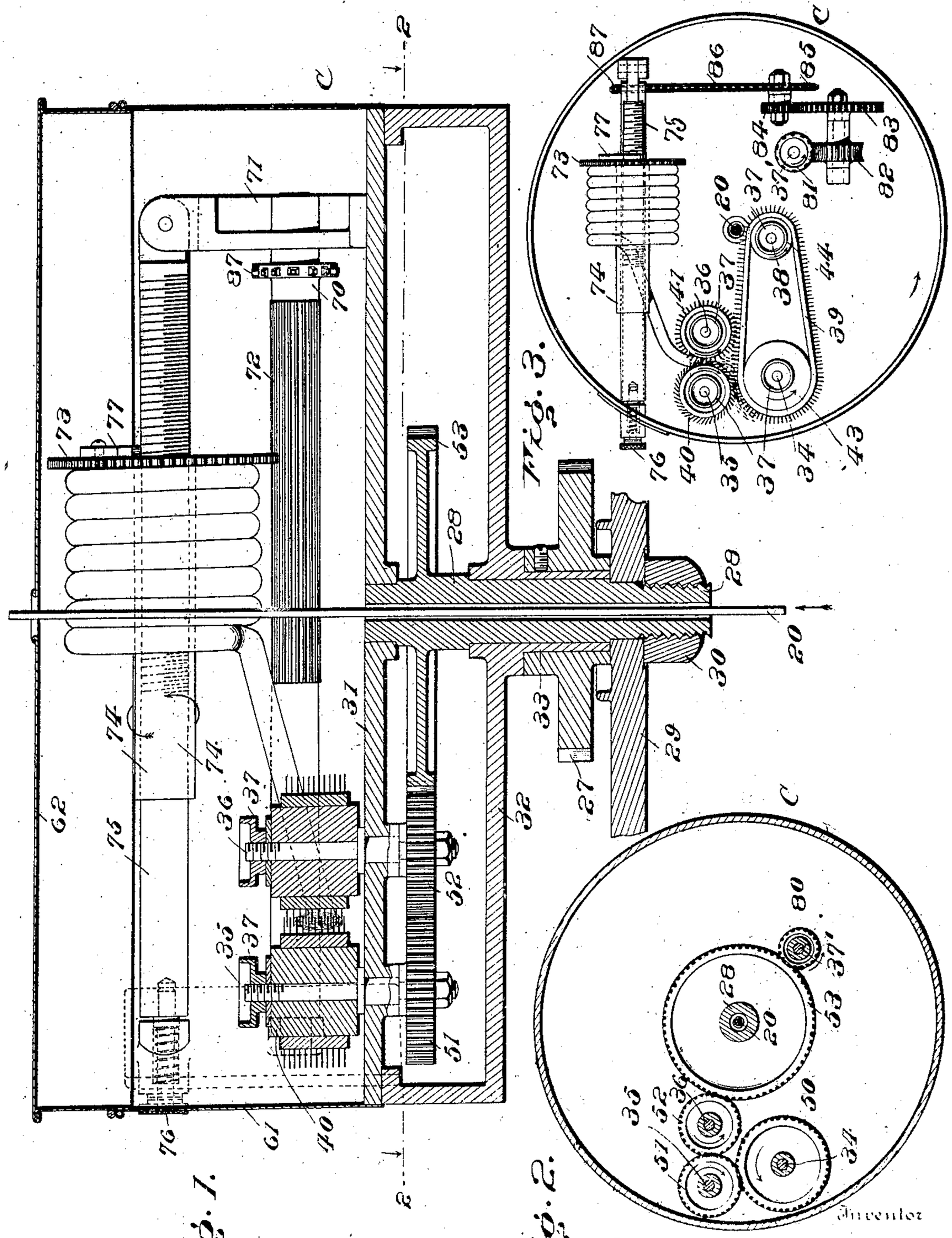

Fig. 1.

Fig. 2.

Witnesses

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APPARATUS FOR APPLYING INSULATION TO ELECTRIC CONDUCTORS.

No. 861,097. Specification of Letters Patent. Patented July 23, 1907.

Application filed July 7, 1904. Serial No. 215,695.

To all whom it may concern:

Be it known that I, LOUIS W. DOWNES, of Providence, Rhode Island, have invented a new and useful Improvement in Apparatus for Applying Insulation to Electrical Conductors, which invention is fully set forth in the following specification.

It is well known that asbestos sliver (better known to the trade as "roving") or analogous substantially untwisted strands of asbestos are extremely delicate and weak, possessing hardly enough tenacity to support their own weight, even in relatively short lengths. A slight strain or pull will cause them to break. For this reason it is difficult to successfully spirally wind asbestos in sliver or analogous form upon an electric conductor, but there are advantages in applying it in the form of sliver rather than in the form of yarn.

The invention consists of an apparatus for spirally winding asbestos in sliver or analogous form substantially without twist on a conductor, the principal object being to avoid pull or strain upon the sliver in its passage from a spool or holder, on which it is coiled, to the conductor.

The novel features of the invention will be readily understood by reference to the accompanying drawing showing the preferred embodiment thereof:

Figure 1 is a vertical section; Fig. 2 a transverse section on reduced scale, on line 2—2, Fig. 1; and Fig. 3 is a top plan on reduced scale with the cover removed.

In its general construction the apparatus illustrated and described embodies the generic invention of my companion application filed July 7, 1904, Serial Number 215,694.

The conductor or wire 20, after receiving a coating of adhesive material, such as shellac, by passing through a receptacle (not shown) containing said material, passes upward through the hollow axle 28 and the carrier C, in which latter it receives a covering of fibrous insulating material. The mechanism for applying the asbestos to the wire is mounted in or upon and rotates with the carrier. The carrier C comprises a plate or table 31, which turns loosely upon the upper extremity of axle 28; also a cup-like casing 32 having a central sleeve 33 which fits loosely about and turns on axle 28. Axle 28 is fixed to a part 29 of the machine-frame by a nut 30. Gear 27 fixed to sleeve 33 is driven by suitable connections (not shown) to rotate the carrier.

Four short vertical shafts 34, 35, 36 and 37′ are journaled in and project above and below table 31. Rolls or wheels 40 and 41 having their surfaces covered with card clothing are secured on the upper ends of shafts 35 and 36 by nuts 37. Pulleys or rollers 43 and 44, the former secured to the upper end of shaft 34, the latter turning on a stud 38, are connected by an endless conveyer or belt 39 having its outer surface covered with teeth. Gear wheels 50, 51, 52 (Fig. 2) on the lower ends of shafts 34, 35 and 36, are driven by a fixed gear 53 (preferably formed integral with axle 28), as the carrier rotates; movement in the direction of the arrows, Fig. 3, is thereby imparted to carding rollers 40 and 41 and conveyer 39. The movement of belt 39 on the pulleys in the direction indicated by the arrow, simultaneous with the rotation of the carrier around the non-rotating wire is of importance in effecting practically a continuous spiral winding or wrapping of the fibers upon the longitudinally moving wire. The linear movement of the card belt continuously advances fiber-bearing portions thereof to the wire as the belt is carried around the wire by rotation of the carrier.

The following means serve to feed the asbestos sliver or untwisted strand to the carding roll and without exerting any pull thereupon. 70 is a shaft journaled at one end in a bracket 71 on table 31 and at its other end in a bearing on the inner surface of a shell 61, which latter with its cover 62 incloses the mechanism on the carrier above the table. An elongated pinion 72 on shaft 70 meshes with a gear wheel 73 fixed to a spool or holder on which the asbestos strand is coiled. A sleeve 74 of the spool is adapted to freely slide on a screw-threaded shaft 75, which latter is pivoted at one end to bracket 71, and secured at its other end by a spring-actuated bolt 76. A segmental nut 77 secured to gear wheel 73 may be turned into engagement with the screw-threads on shaft 75, thereby imparting a longitudinal feed movement to the spool as it is turned by pinion 72. Shaft 70 is rotated by gear 53 meshing with gear 80 on the lower end of shaft 37′, worm 81 (Fig. 3) on the upper end of shaft 37′, worm-wheel 82, gears 83, 84, sprocket wheel 85, chain 86 and sprocket wheel 87.

The operation of the apparatus is as follows: The wire 20 fed longitudinally in the direction of the arrow, Fig. 1, passes into the rotating carrier C coated with adhesive material. From the spool the end of the asbestos sliver or strand passes between the carding rolls 40 and 41. The teeth of roll 41 are preferably straight, while those of roll 40 are inclined; the fibrous material consequently adheres to the latter, from which it is picked up by the teeth of conveyer or belt 39, (the surface speed of which is preferably faster than that of roll 40), and carried forward into contact with the sticky surface of the wire to which it adheres or is licked up from the belt. The rotary movement of the carrier and the longitudinal movement of the wire act to spirally coil or wrap the insulation on the wire. The carding rolls and belt act to further card the sliver and to flatten the same preparatory to its application to the wire. Rotation of the carrier also rotates the spool to unwind the sliver therefrom and slowly moves the spool to the left, so that the distance between the point where the sliver or strand leaves the spool and the point of its entry between the carding rolls is at

all times approximately the same. These movements of the spool or holder together with the feeding movements of the rolls and belt, relieve the delicate weak sliver of pull which tends to break or separate the same. To recharge the sliver spool or holder, bolt 76 is disengaged from the end of shaft 75, the latter swung upward and the spool removed, segmental nut 77 having first been swung aside to disengage it from the screw thread on the shaft.

From the apparatus herein described, the conductor may pass to any suitable apparatus for compressing, compacting and otherwise finishing the covering; for example, the apparatus of my Patent No. 534,785 of February 26, 1895. The covering may be impregnated with any suitable fire-proofing and water-proofing composition. One or more layers of asbestos may be applied according to the thickness of insulation desired.

What is claimed is:

1. In apparatus for applying fibrous insulating material to a conductor, the combination of a carrier and means for rotating the same about the conductor, a spool or holder mounted on the carrier and adapted to hold a coiled strand of fibrous insulating material, means operating during rotation of the carrier for rotating the spool on its axis to unwind the strand and for simultaneously imparting another feed movement to the spool to enable the strand to be continuously disengaged from the spool always at approximately the same distance from its point of application to the conductor.

2. In apparatus for applying fibrous insulating material to a conductor, the combination of a carrier and means for rotating the same about the conductor, a spool or holder mounted on the carrier and adapted to hold a coiled strand of fibrous insulating material, means operating during rotation of the carrier for rotating the spool on its axis to unwind the strand and for simultaneously imparting a longitudinal axial feed movement to the spool to enable the strand to be continuously disengaged from the spool always at approximately the same distance from its point of application to the conductor.

3. In apparatus for applying fibrous insulating material to a conductor, the combination of a carrier and means for rotating the same about the conductor, a shaft mounted on the carrier, a spool or holder adapted to hold a coiled strand of fibrous insulating material and having screw-thread engagement with and rotatable on and movable along the shaft, and driving connections for rotating the spool during rotation of the carrier thereby unwinding the strand from the spool and simultaneously moving the latter along the shaft to continuously disengage the strand from the spool always at approximately the same distance from its point of application to the conductor.

4. In apparatus for applying fibrous insulating material to a conductor, the combination of a carrier and means for rotating the same about the conductor, a spool or holder mounted on the carrier and adapted to hold a coiled strand of fibrous insulating material, carding rolls and a feed-belt rotatably mounted on the carrier and adapted to continuously convey the strand from the spool and deliver the same into contact with the surface of the conductor, connections for driving said rolls and belt during rotation of the carrier, and other connections operating during rotation of the carrier for rotating the spool to unwind the strand and for simultaneously moving the spool toward the point where the strand enters between the carding rolls.

5. In apparatus for applying fibrous insulating material to a conductor, the combination of a carrier and means for rotating the same about the conductor, a spool or holder mounted on the carrier and adapted to hold a coiled strand of fibrous insulating material, a carding surface mounted on the carrier and adapted to feed the fibrous strand to the surface of the conductor, and driving connections for advancing said carding surface on its bearings on the carrier during rotation of the latter to present fiber-bearing portions of said surface to the surface of the conductor.

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

LOUIS W. DOWNES.

Witnesses:
JAMES H. THURSTON,
NELLIE G. BRADLEY.