No. 774,525. PATENTED NOV. 8, 1904.

E. U. MACK.

CONDUIT THREADING MACHINE.

APPLICATION FILED APR. 23, 1904.

NO MODEL.

Fig. 1,

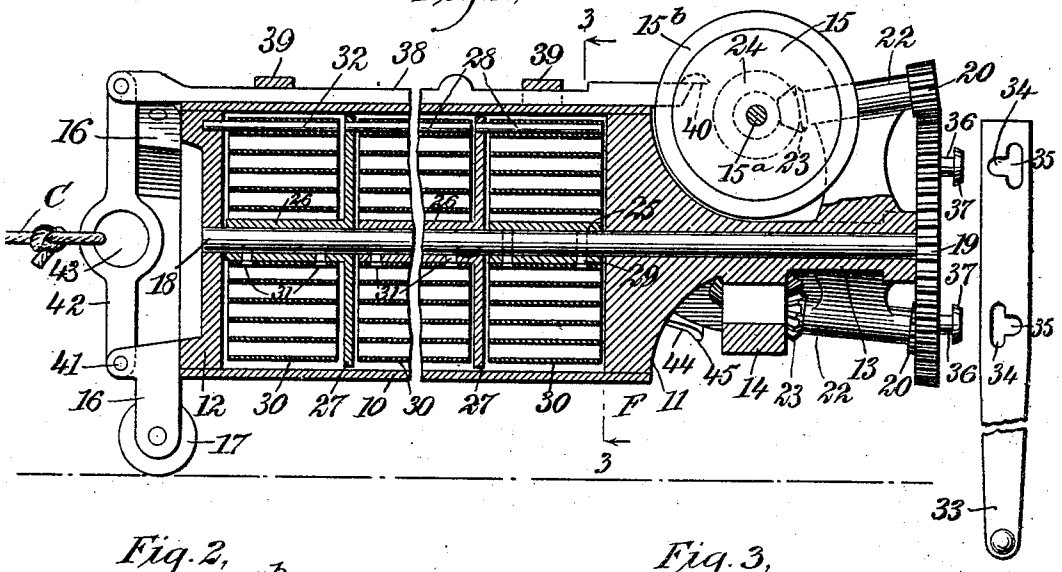


Fig. 2,

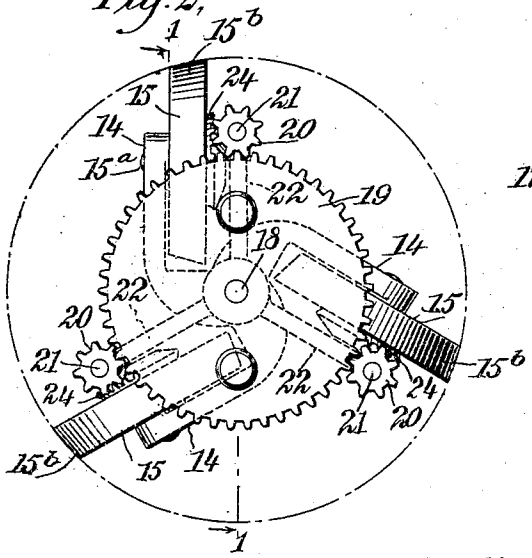


Fig. 3,

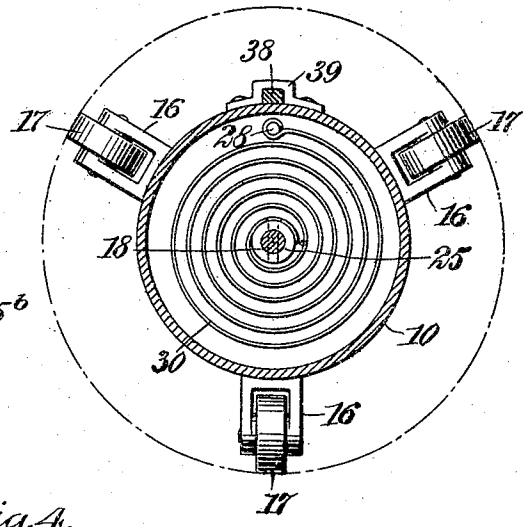
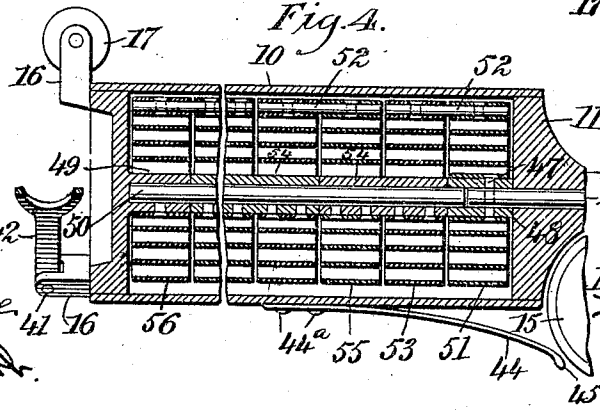


Fig. 4.



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No. 774,525. Patented November 8, 1904.

UNITED STATES PATENT OFFICE.

ERNEST ULMO MACK, OF FLORENCE, SOUTH CAROLINA.

CONDUIT-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 774,525, dated November 8, 1904.

Application filed April 23, 1904. Serial No. 204,573. (No model.)

To all whom it may concern:

Be it known that I, ERNEST ULMO MACK, a citizen of the United States, and a resident of Florence, in the county of Florence and State of South Carolina, have invented a new and Improved Conduit-Threading Machine, of which the following is a full, clear, and exact description.

My invention relates to machines for traversing conduits to effect the drawing in of an electric or other conductor or a cord for attachment to such conductor. Its principal objects are to provide an effective apparatus of this class which will act automatically.

It consists in the various features and combinations hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section of one embodiment of my invention on the line 1 1 of Fig. 2, the winding-crank being shown as detached and turned at right angles thereto. Fig. 2 is an end elevation looking from the right of Fig. 1. Fig. 3 is a transverse section on the line 3 3 of Fig. 1, and Fig. 4 is a partial central vertical longitudinal section through another form of my invention.

F designates a frame which is here shown as consisting of a cylindrical casing 10, the opposite extremities of which are closed by end sections or heads 11 and 12. The head 11 is preferably provided with a central forward extension 13, from which radiate arms 14, in the present instance three in number, and arranged symmetrically about the extension at angles of one hundred and twenty degrees apart. In each of these arms is journaled a traction-wheel 15 upon a short shaft 15^a, these wheels being provided with yieldable peripheral portions 15^b, preferably of rubber. From the opposite head 12 extend pairs of brackets 16, conveniently arranged in the same manner as the arms 11 and having journaled between them supporting-wheels 17.

Through the head 11 centrally of its extension is a longitudinal bore, in which is journaled a main shaft 18, extending through the casing and supported at its opposite end in a bearing at the center of the head 12. Upon the shaft 18 just outside the end of the extension 13 is fixed a spur-gear 19, with which mesh pinions 20, secured upon the ends of shafts 21. These shafts are shown as occupying a slightly-inclined position and are journaled in bearings in arms 22, projecting from the outer end of the head extremity and have fixed at their inner ends bevel-pinions 23, each of which coacts with a bevel-gear 24, mounted or formed upon a face of each of the traction-wheels.

Surrounding the shaft 18 within the casing is a sleeve 25, situated adjacent to the head 11, and between this and the opposite head is a series of sleeves 26, each of which has at one end a flange 27, carrying near its edge a pin 28, which projects toward the head 11, extending substantially parallel to the shaft. To the sleeve 25, conveniently by means of rivets 29, which extend through it and the shaft, is secured the inner end of a coil-spring 30, the outer extremity of which is made fast to the pin of the succeeding sleeve-flange. To each successive sleeve is secured a similar spring, the securing-rivets 31 of which do not penetrate the shaft, leaving the sleeves free to turn thereon. Each of these springs is connected at its outer end to the pin of the next sleeve-flange until the last is fastened to a pin 32, projecting inwardly from the head 12 of the casing. These successively-connected springs form a train and act as a single long spring, which when put under tension will exert its force to drive the shaft 18 and its gear and through the intermediate gearing rotate the traction-wheels. To wind up this spring system, a detachable crank 33 is provided, in which is formed a pair of slots 34 34, having at their sides oppositely-situated connected openings 35. Upon the outer face of the gear 19 are fixed two pins or projections 36, having heads 37. The separation of the pins and the size of the heads is such that the crank-openings may be brought into coaction with them, and when force is applied thereto the stems of the pins will seat themselves in the openings 35 and hold the crank against longitudinal movement.

To hold the spring system under its applied

tension until it is desired to release it for operation, locking mechanism is provided, here shown as consisting of a rod 38, mounted for longitudinal movement along the top of the casing through guides 39 39, secured to the casing, said rod coöperating at one extremity with a stop projection 40 from a face of one of the traction-wheels. Fulcrumed at 41 upon one of the pairs of brackets 16 is an opening-lever 42, articulated at its opposite end to the adjacent extremity of the rod 38. In this lever is an opening 43, to which may be attached a cord C or the like, which the machine is to draw behind it in use.

The apparatus is also preferably provided with brake mechanism to control the rotation of the traction-wheels, which in the present instance is shown as comprising a spring member 44, riveted at 44ª to the wall of the casing and having its opposite end curved at 45 for contact with one of the traction-wheels.

In use the crank is applied to the pins upon the gear 19 and the shaft rotated to put the motor spring system under the required tension. The rod 38 is then moved inward until it is engaged by the stop projection 40, locking the wheels and preventing the unwinding of the spring. The crank is removed, and a suitable cord being secured to the lever 42 the forward end of the machine is inserted in the conduit to be threaded, the yieldable surfaces of the traction-wheels pressing against its walls. Then upon the release of the wheels, through drawing back the locking-bar by a slight jerk upon the cord, the force of the spring rotates the wheels and advances the machine through the conduit. Upon its emergence at the opposite end the brake member is grasped by the person waiting to receive it, thus enabling the unwinding of the spring to be checked until the apparatus has been wholly withdrawn and the wheels again locked by the bar. The cord is then pulled through the conduit by hand, drawing after it the conductor which has been attached.

In the form of my invention illustrated in Fig. 4 the driving-shaft 46 instead of being continued through the casing is journaled in the head 11 only and has fixed to its inner end by a rivet 47 a sleeve 48. In this sleeve and in a bearing-sleeve 49, projecting from the center of the head 12, is journaled a loose shaft 50. Fixed at its inner end to the sleeve 48, conveniently by the same rivet which secures it to the shaft, is a coil-spring 51, which has secured at its outer extremity a longitudinally-extending pin 52, which is also fastened to the adjacent end of a spring 53, riveted at its inner end to a sleeve 54, loose upon the shaft 50. Beside this spring 53 is attached to its sleeve a similar spring 55, carrying at its outer end a pin 52, which serves to connect the pair with a similar pair of springs mounted in the same manner upon a sleeve 54. Any number of pairs of springs may be thus connected, the last being secured by its pin to a spring 56, fixed at its inner end to the sleeve 49. The operation and result of this spring system is similar to that previously described.

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

1. In a conduit-threading machine, the combination with a casing having a head, of a shaft journaled in the head and extending through the casing, a motor situated within the casing and being connected with the shaft, and wheels carried by the head and geared to the shaft.

2. In a conduit-threading machine, the combination with a casing having a head, of a shaft journaled in the head and extending through the casing, a spring situated within the casing and being connected with the shaft, and wheels carried by the head and geared to the shaft.

3. In a conduit-threading machine, the combination with a casing having a head provided with an outward extension, of a shaft journaled in the head extension, a motor situated within the casing and being connected to the shaft, and wheels carried by the head and geared to the shaft.

4. In a conduit-threading machine, the combination with a casing having a head provided with an outward extension, arms projecting therefrom, of a shaft journaled in the head extension, a motor situated within the casing and being connected to the shaft, and wheels journaled in the extension-arms and geared to the shaft.

5. In a conduit-threading machine, the combination with a casing having opposite heads, of a shaft journaled in the heads, a plurality of springs situated within the casing and connected with one another, the outer springs being connected to one of the heads and to the shaft, wheels carried by the head opposite that to which the springs are connected, and gearing between the shaft and wheels.

6. In a conduit-threading machine, the combination with a casing having a head, of a shaft journaled in the head and extending through the casing, a motor situated within the casing and being connected with the shaft, wheels carried by the head and geared to the shaft, and a rod mounted to slide upon the casing and coacting with a wheel.

7. A machine for threading conduits comprising a frame, a driving-shaft journaled therein, a projection from the frame extending substantially parallel to the driving-shaft, and a spring secured at one end to the projection and having its opposite end connected with the shaft.

8. The combination with a frame, of traction mechanism carried thereby, a driving-shaft journaled in the frame, a plurality of sleeves surrounding the shaft, and a spring fixed to each sleeve, the springs at opposite ends of the series being also secured to the shaft and frame.

9. The combination with a frame, of traction mechanism carried thereby, a driving-shaft journaled in the frame, a plurality of flanged sleeves surrounding the shaft, a spring fixed to each sleeve and to a flange of the next adjacent sleeve, the springs at opposite ends of the series being secured to the shaft and frame.

10. The combination with a frame, of traction mechanism carried thereby, a driving-shaft journaled in the frame, a plurality of flanged sleeves surrounding the shaft, pins projecting from the flanges substantially parallel to the shaft, and a spring fixed to each sleeve and to the pin upon the flange of the next adjacent sleeve, the springs at opposite ends of the series being secured to the shaft and frame.

11. The combination with a frame including an end section provided with arms, of traction-wheels supported upon the end section, a main shaft journaled in said end section, intermediate shafts journaled in the arms, gearing connecting the main and intermediate shafts, and gearing between the intermediate shafts and traction-wheels.

12. The combination with a frame including an end section provided with arms, of traction-wheels supported upon the end section, a main shaft journaled in said end section, intermediate shafts journaled in the arms, spur-gearing connecting the main and intermediate shafts, and bevel-gearing between the intermediate shafts and traction-wheels.

13. A machine for threading conduits comprising a frame, wheels journaled thereon, a motor mounted upon the frame and connected with the wheels, a rod mounted to slide longitudinally of the frame and movable into coaction with a wheel, and a lever fulcrumed upon the frame and connected to the rod.

14. A machine for threading conduits comprising traction mechanism for coaction with the conduit, a motor carried by the machine and connected with the traction mechanism, and brake mechanism for operating upon the traction mechanism.

15. A machine for threading conduits comprising a frame, wheels journaled thereon, a motor mounted upon the frame and connected with the wheels, and a brake carried by the frame and movable into coaction with a wheel.

16. The combination with a frame including a tubular casing, of traction-wheels carried by the frame, a driving-shaft journaled in the frame and extending through the casing, a spring situated within the casing and connected with the frame and shaft, and a spring member secured at one end to the casing and having its opposite end movable into coaction with a wheel.

17. A machine for threading conduits comprising a frame, wheels journaled thereon, a driving-shaft journaled in the frame, a motor-spring connected with the shaft, headed projections carried by the shaft, and a winding-crank having slots and oppositely-situated lateral openings for engagement with the projections.

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

ERNEST ULMO MACK.

Witnesses:

JAMES ALLEN,

GRACE NAYSMITH.