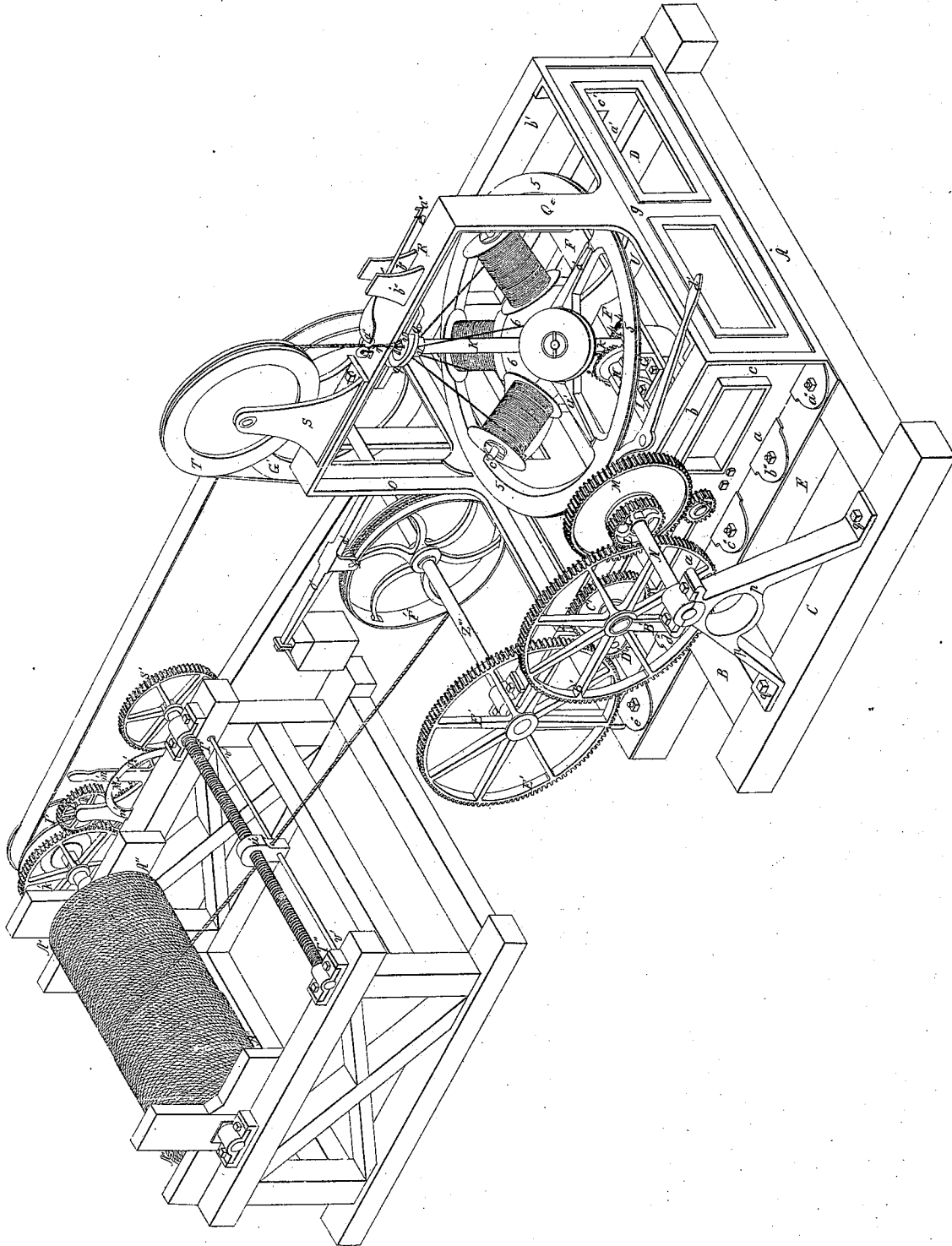


*E. S. Townsend,
Making Wire Rope.*

No 5,346.

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UNITED STATES PATENT OFFICE.

EDWARD S. TOWNSEND, OF TRENTON, NEW JERSEY.

IMPROVEMENT IN MACHINERY FOR THE MANUFACTURE OF WIRE ROPE.

Specification forming part of Letters Patent No. 5,346, dated October 30, 1847.

To all whom it may concern:

Be it known that I, EDWARD S. TOWNSEND, of the city of Trenton and State of New Jersey, have invented a new and Improved Mode of Making Cord of Wire; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in placing bobbins on radiating arms projecting from a disk on the main shaft, which shaft is pierced with holes at its upper end to receive the wires from the bobbins. Through these holes the wires pass to grooved rollers, (forming a tube adjustably weighted,) where they are firmly compressed and held until by the revolution of the main shaft they are bent around each other to form a cord, by which arrangement I at this point detect all imperfections in the wires and am enabled to hold on and splice and solder the same. From this point the cord formed is taken away by passing it around an adjustable or changeable drum (geared positively and adjustably) which has tubing-rollers (like those before mentioned) placed so as to hold the cord on the drum. By the first pair of tubing-rollers I thus keep back the wild turn, yet allow the increased size of any part of the cord (made so by soldering or splicing) to pass the yielding rollers, and by the second set of tubing-rollers I produce greater adhesion to the drum, which takes up the cord, gives greater uniformity to the laying of the twist and rounds it as it passes onto a reel, which is connected to the foregoing machinery by belts or otherwise. In this way I succeed in making wire cord of good merchantable qualities, free of split, of blistered wires, and of wild turns, with an even lay of twist, round in form and manufactured at a greatly-increased speed.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

It is made of wood and metal. The bed may be a frame composed of two parallel sill-pieces A B, two cross-pieces C D, and an intermediate cross-piece E parallel to the two others and all at right angles with the sill-pieces. The main framing which supports the shafts for gearing is made of cast metal. It is composed of two rectangular pieces $a b c d$ and $a' b' c' d'$, placed one upon an end

and the other on the intermediate cross-piece. The sides of the rectangles resting upon the cross-pieces have projections or flanges, as $a'' b'' c'' d'' e''$, through which they are screwed firmly to the cross-pieces E and D of the platform. The upper sides of these rectangles are extended toward the reel to support a shaft Z''' , and the ends thus projecting are supported by vertical posts resting upon a projection in the same direction of the cross-pieces of the platform, or, as in the model, by a brace extending from under the ends of these arms to the bottom of the rectangular frames $a b c d$ and $a' b' c' d'$. Connecting the centers of the bottom pieces a and a' of the rectangular frames is a breech-tree F, with a step G, for a vertical shaft K, and on this center piece F rests a pillow-block with bearing and cap H to receive a short driving-shaft I, with a beveled gearing 1 2 3. Upon the other outer cross-piece C of the platform rests a pillow-block having two angular legs p , with flanges q to attach it to the cross-piece C. This pillow-block is for the purpose of receiving the journal N of a pulley-shaft, and which is to have upon it two pulleys, one fixed, the other free, and two cog-wheels L M.

Above the center of the main frame and in the direction of the reel is a vertical frame O R Q, having three sides, two vertical, and an upper cross-piece R. Upon the top of this frame rests a stand S to support a grooved wheel between its cheeks, the shaft of which is perpendicular to the cheeks. Through the center of R, the top piece of this frame, a hole is drilled at r for the purpose of passing the wires through. Over this hole r a stand T is secured, having a roller grooved, between which and a grooved roller in the end of a lever a'' the wire passes up. The lever is secured between the uprights of a stand, as $b'' b''$, on the opposite side of the hole r . On this lever a sufficient weight is placed to regulate the tubing.

On the under side of the cross-piece R of the vertical frame or gallows are two screw-swells, one on each side of the hole r . Through these swells on the under side a bearing is fastened to R. Below this bearing the shaft passes through the hub 6 of the wheel 5, thence through a shaft-hole, thence downward to its step in the breech-tree at G. This

shaft-hole is supported by three curvilinear radiating arms with their concavity on their upper sides, so as to allow the bobbins to revolve. One of these arms is seen at U. The upper end of the shaft K is terminated by a swell. Through this swell in the shaft holes are drilled, so that being pierced at the bottom of the swell by each wire they will all have a direction to the center of the aperture r in the middle of r , and between the bearing and r form a cone, and it is at this point r where the winding takes place in making the wire cord or rope. On the lower end of the shaft K is a beveled cog-wheel gearing 4. About the middle of the shaft is a large grooved wheel 5, having a broad hub 6 and four arms, two of which are seen at a' . On the rim of the hub (the rim being inclined by the lower circle being greater than the upper) are four projections or cylindrical swells, into which are screwed four cylindrical bolts, two of which are seen at c' , at equal distances around the hub from each other and making an angle of about forty degrees with a horizontal plane. These bolts hold the bobbins which contain the wire, and the bobbins revolve freely around them and are kept on by a pin placed through a pin-hole in the end of the bolt. On the outer side of the upright O of the vertical frame is a lug, through which a pin passes, fastening a lever to it. Between two short arms on the under side of this lever is a cylindrical wheel with circular grooves for the purpose of tubing the cord as it passes around the wheel F' underneath, and thence to the reel, the end of the lever supporting the weight necessary for tubing. There is a lever attached to the upper edge of the rectangular side $a b c d$ of the frame. This lever is seen at d' , and it is bent near the inner end, the edge of the bend being shaped like a V to fit into the groove of the wheel 5 and to clamp it, and thus at any moment stop its motion.

On the pulley-shaft N there is a pinion-wheel L, and beyond or inside of it a cog-wheel M. The wheel M meshes into the cogs of a pinion A' beneath it, and which is upon one end of a driving-shaft I, the other of which rests on the pillow-block G on the breech-tree F, and on this end of the shaft I is a beveled gearing 1 2 3, which imparts motion to the beveled gearing 4 of the main shaft K. The pinion L on the pulley-shaft meshes into a large cog-wheel B', which revolves on a stud passing through a bearing in the main frame. On this same stud and inside of B' there is a pinion-wheel C', which meshes into the cogs of another small cog-wheel D', attached to the main frame by a stud. This cog-wheel D' meshes into a large cog-wheel E', which works a driving-shaft Z''', supported by the projection of the upper sides b and b' of the rectangular sides of the main frame. This shaft Z''' has a wheel F' upon the middle of it shaped like a locomotive-wheel, and a band or groove wheel G'

upon its other end. Motion is communicated by band from the wheel G' to the machinery of the reel. The reel A'' is placed on this side of the machine above described and at a convenient distance from it, on which the cord or rope is reeled as it comes from the machine which makes it. On the shaft of the reel there are two wheels, the inner one a cog, as K', and the outer a band or groove, as I'. This cog-wheel K' works alternately into two other cog-wheels L' and M', in order to change the direction of the traverse U' or guide. These cog-wheels are placed on radiating arms. There are three of these arms, the third m' being longer than the other two, having no cog-wheel on it, but is used for a lever to change the positions of the cog-wheels L' M'. There is a pin fast to and projecting from the frame, which passes through the center of these radiating arms, and on the pin outside of the lever is another small cog-wheel N'. Either L' or M' meshes into N', and it meshing into the cog-wheel S' on the end of the shaft of the screw gives motion to this screw T'. Below this screw is a guide-bar V'. The guide U' has a female screw through it, which fits the screw T', upon which it travels, and through the lower end it has a cylindrical hole to pass the guide-bar through. The upper end of this traverse U' has a cylindrical hole through it in the direction of the machine, and through which the cord passes to the reel and is equally distributed over it by the lateral motion given by the screw to the guide which is on it.

Directly over the pin which supports the radiating arms is a dial n' , fastened to the side of the frame which supports the reel and screw, and this dial n' has two holes through it. Through the arm m' and it I put in a pin to obtain one motion for the screw and through the other hole the reverse motion as it raises or depresses the cog-wheels upon the other two radiating arms. A band around the wheel G' and the wheel I' communicates the motion of the machine to the reel. The wire being upon the bobbins, they are placed in position around the hub 6 of the main wheel 5. Each wire is passed through a hole in the swell of the upper end of the main shaft K. Then all are passed through r , a hole in the center of the cross-piece R of the vertical frame, through the tubing-rollers of the box 7 or lever, over the wheel T, down and two or three times around the periphery of the wheel F', through the guide U', around the reel, where it is fastened.

Motion being given to the driving-shaft N, it is communicated by the cog-wheel M to the pinion A', to the shaft I, to the beveled gearing at the bottom of the main shaft K, to the main shaft K, and consequently to the bobbins on the hub of main wheel, and causing them to revolve with the main shaft K bends each wire around the others at the point r , where they meet. To reel it the pinion L meshes into the cog-wheel B', the pinion C'

on the same stud meshes into the small cog-wheel D', which meshes into the large cog-wheel E', which being on the shaft Z''' gives motion to the tubing-wheel F and to the band-wheel G', and by a band around G' and I' on the shaft of the reel to the reel A''.

To use this machine I fill the bobbins with wire, place them on the arms radiating from and connected with the shaft. The ends of the wire passing through the apertures in the end of the shaft unite at the grooved rollers, thence passing round the drum under the second grooved roller, which drum is geared to revolve with the machine, it is passed to the reel. The main shaft revolving bends round the wire, forming it into a cord at the first set of grooved rollers. The drum hauls off the cord as it is formed, the reel winding it up, and the bobbins running off the wire by revolving on the arms as the cord is formed.

What I claim as my invention, and desire to secure by Letters Patent, is—

Making wire cord or rope by arranging the bobbins with wire on radial arms projecting at a suitable angle from a disk at right angles to the axis of the main shaft, by which the wire is fed and allowed one twist to every revolution of the main shaft between the bobbins and the tubing-rollers, as above described, and thus obviating the complicated gearing, which would give the bobbins another revolution contrary to the motion of the main

shaft to avoid any twist in the single wires, obtaining a greater speed and economy in manufacture, and preserving in the wire the turn, which bending the wires retains such a power as detects those splits and blisters or otherwise imperceptible defects in the wire which would injure the cord, and thus doing this at such a time as is most convenient to mend them and make a more perfect and reliable article in a manner nowise injuriously affected as to the fiber of the wire, and in combination with this that arrangement of tubing-rollers suitably weighted which holds the cord as the wires are passed round in forming, keeping back the wild turn from the cord, and yet allowing the increased size of wires from splicing or soldering to pass the grooves by the yielding of the lever and weight, and in combination with these the tubing-rollers suitably weighted which bear upon the cord as it passes round the drum geared to haul off the cord, so as to cause greater adhesion between the drum and cord, giving greater uniformity in the lay of the twist in the cord, and rounding it as it passes to the reel, with which it is connected with bands or belts, the whole being constructed as is herein set forth.

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Witnesses:

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