

(No Model.)

2 Sheets—Sheet 1.

T. L. JOHNSON.
WIRE CRIMPING MACHINE.

No. 346,479.

Patented Aug. 3, 1886.

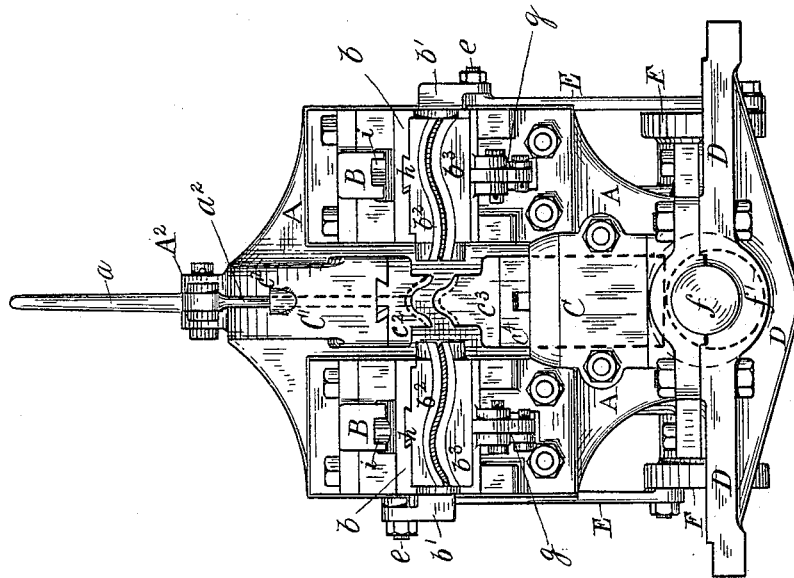


Fig. 2.

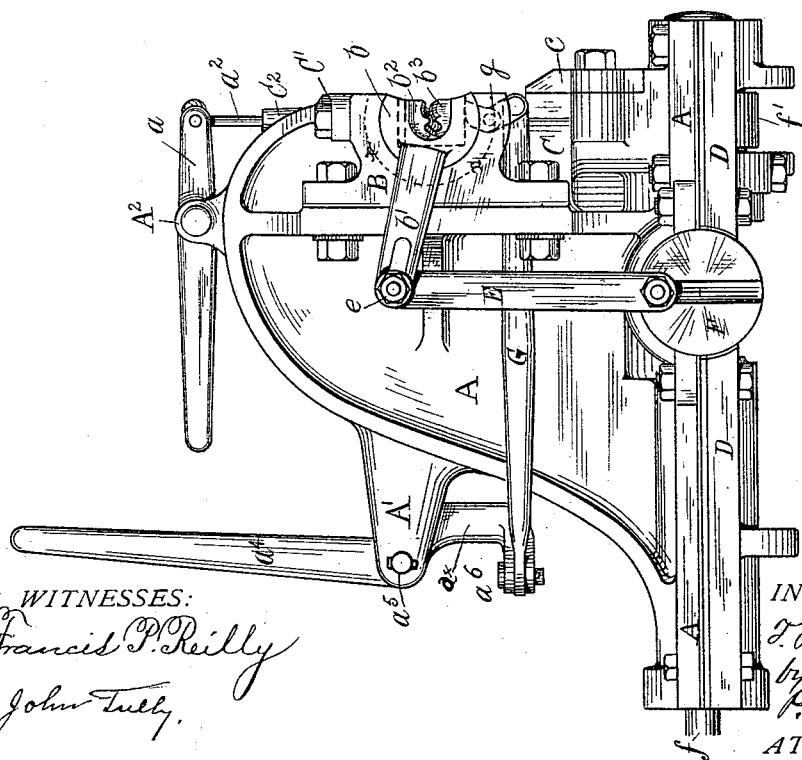


Fig. 1.

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2 Sheets—Sheet 2.

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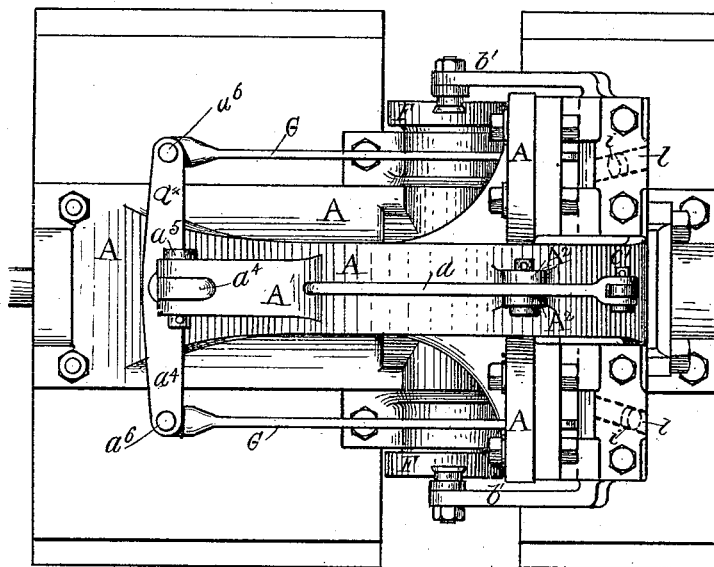


FIG. 3.

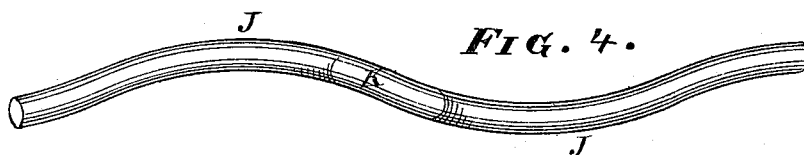


FIG. 4.

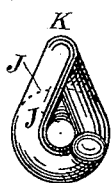


FIG. 6.

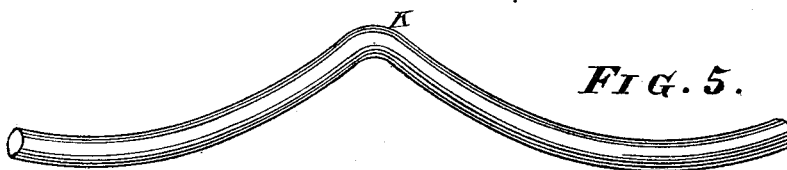


FIG. 5.

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UNITED STATES PATENT OFFICE.

TOM L. JOHNSON, OF CLEVELAND, OHIO.

WIRE-CRIMPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,479, dated August 3, 1886.

Application filed February 13, 1886. Serial No. 191,891. (No model.)

To all whom it may concern:

Be it known that I, TOM L. JOHNSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Machine for Crimping the Strands of Wire Cables, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to make a machine that will impart a series of crimps in the exterior solid strands of a wire cable, such crimps to form loops or eyes, by means of which and by cross bars or stops riveted through said eyes two cables may be connected together to form a double cable suitable for use as a traction-cable for "cable railways."

The invention consists of the parts and combinations of parts hereinafter described, and set forth in the claims.

In said drawings, Figure 1 is a side elevation of the machine. Fig. 2 is an end elevation of Fig. 1, viewed from the right-hand side. Fig. 3 is a plan of the machine. Fig. 4 shows in plan a piece of a wire strand after having had a crimp imparted to it by the machine. Fig. 5 shows in side view the strand shown in Fig. 4. Fig. 6 is an end view of the strand shown in Fig. 5.

In said figures the several parts are indicated by letters, as follows: A, the housing of the machine; B B, casings in which two socket-pieces $b\ b$ are fitted to vibrate on each side of the housing A by means of their arms $b'\ b'$, forming parts of said socket-pieces. Said casings are bolted to the housing A. The socket-pieces $b\ b$ have each let into them two steel die-pieces, $b^2\ b^3$ —four in all. The upper dies, b^2 , are rigidly keyed into the socket-pieces $b\ b$ at the dovetails $h\ h$. The lower dies, b^3 , are free to move up and down, and are actuated for such motions by the levers G and toggle-joints $g\ g$. Said levers are operated by the arm or lever a^1 , united thereto by pins a^2 and working on a fulcrum at a^3 in a lug or offset, A' , on the housing A. The socket-pieces $b\ b$ are caused to vibrate by means of the crank-wheels F F, which connect therewith by the arms E E, having pins $e\ e$ passing through slots in the ends of the arms $b'\ b'$, said connection serving as an adjustable connection in a well-known manner. The path or passage between

the upper and lower dies, $b^2\ b^3\ b^2\ b^3$, is helical, as indicated by the double lines of separation between said dies. The shaft which carries the crank-wheels F F is journaled in bearings under the housing A. The upper part of said housing ends in an overhang, C' , in which is a boss, C^2 . Through said boss a plunger, a^2 , passes, actuated by an arm, a , working between the lugs A^2 on top of the housing A. Keyed to the lower part of the overhang C' is a stationary crimping-die, c^2 . In the plate C is guided the piston c^1 , actuated to rise by means of the eccentric f' on the shaft f , and falling by its own gravity. The piston c^1 carries with it the lower crimping-die, c^3 .

The purpose and operation of the machine are as follows: The machine is designed to take a wire already set to the form of numerous helical convolutions of uniform pitch, to which the helical pitch of the groove or passage through the dies $b^2\ b^3$ corresponds, and to put a series of crimps in said wire, so that when a number of these wires are woven or laid up together they will form a cable provided with a series of loops or eyes wherever said crimps appear. The wires are so laid up together that each crimp protrudes on one and the same side of the cable, and all are situated at regular intervals apart. Two of these cables, being laid side by side, may be connected by a series of stops. The stops may be made in two pieces and connected by rivets passing through said loops or eyes, as illustrated in Patent No. 310,285, issued to me January 6, 1885.

In Fig. 6 of the accompanying drawings is shown an end view of a helical wire after the crimp is formed. The dotted lines J J show the form, in an end view, of the part of the helix not crimped, while the letter K indicates the crimp protruding beyond the true curvilinear path of the helix. Said crimps are formed on the same wire, say, every sixth or seventh pitch distance apart, according to the number of wires in the cable, by which means the crimps are distributed uniformly over every wire in the cable. It is possible, however, to put a crimp at uniform and suitable distances in the same wire, and then to weave this wire in with all the other wires (uncrimped) forming the cable; or the crimps may be otherwise distributed among the wires of the cable, so

long as the purpose is effected of distributing a series of loops or eyes protruding at regular intervals, all on one and the same side of the finished cable.

5 The operation of the machine, which can now be readily understood, is as follows: A wire of any convenient length permanently set in helical convolutions of uniform pitch is placed between the open dies $b^2 b^3$, when, by
10 turning the lever a^4 , the lower movable jaw, b^3 , is moved up to the stationary upper jaw, b^2 , and the wire is thus clamped between said jaws. As the interior or faces of said jaws or dies are the same in curve and pitch as the con-
15 volutions in the wire, no distortion of the wire ensues from such clamping. The shaft f , being now rotated by any suitable means, (not shown,) forces the piston c^4 , with its crimp-
20 ing-die c^2 , up against the stationary crimping-die c^3 , thus forming the crimp in the wire. As this formation of said crimp takes up metal, the part of the helix or convolution clamped must be drawn together; otherwise distortion of the helix or fracture of the wire may ensue.
25 The approach or "feed" of the metal must also be in a helical path, not in a rectilinear course, or the helix in the wire would not be preserved. Such feed requires a partial rotation of the wire around the neutral axis of the helix si-
30 multaneously with a movement of each set of dies toward the crimp—that is, the left-hand clamping-dies move to the right and the right-hand clamping-dies move to the left, while each set is partially rotated. Such rotation is
35 effected, as before described, by means of the crank-wheels $F F$ through the connecting-rods $E E$ and levers b^4 . The side motions or inner movements of each set of dies are effected by means of projections $i i$ on the back of the
40 sockets $b b$, set like pins or sections of screw-threads in grooves formed in and around the back part of the casing $B B$. (Indicated by the dotted circle of $x x$, Fig. 1.) Said grooves are given such a pitch in their wind,
45 as indicated by the dotted lines $l l$ in Fig. 3, as will secure, on the rotation of the socket-pieces $b b$, the desired lateral feed-motion of the dies $b^2 b^3$, the projections $i i$ in said socket-pieces having a pitch corre-
50 sponding to that of said grooves. The winding-grooves may be put in the socket-pieces and the pins in the casing, if preferred, and quite obviously the same effect will be pro-
55 duced. It will be observed that the rotation of the socket-pieces $b b$ is in opposite direc-
60 tions, one having an angular motion to the left, the other to the right, as is apparent from the positions of the two crank-wheels $F F$, Fig. 2. The action by which said crimping is effected can best be described in a few words by saying that as such crimping takes place the helical dies are screwed together to an extent sufficient to furnish or feed metal equiva-

lent to the amount taken up in the crimping. While this provision is made for thus feeding 65 the wire to the amount taken up in the crimping, yet such provision is not absolutely necessary in all cases. With a very stiff (high-carbon-steel) wire the distortion would be lit-
70 tle or none if a rather loose fit be given to the clamping-dies, the act of crimping in such case drawing the wire through said dies without appreciable distortion. Under the same cir-
75 cumstances, however, a very soft (or low-carbon-steel) wire would suffer some distortion. With a very short wire, also, the screw-mo-
80 tion feed of the clamping-dies may be dispensed with, said dies having a sufficiently-loose fit; but with a very long wire, occasion-
ing much greater resistance, due to greater friction and weight, the provision for positive feed motion in the clamping-dies, hereinafter described, becomes advantageous.

Each wire to be crimped may be conveniently fed into this machine from crimp to 85 crimp, either by hand or by any suitable special machinery designed for and applied to such purpose.

The province of the arm a and plunger a^2 is to extract or force the crimped wire out of 90 the upper die should the wire hang therein.

Having thus fully described my said wire-crimping machine, as of my invention I claim—

1. A machine for crimping wire, provided 95 with helically-faced clamping-dies, a crimping-plunger and die arranged and combined so as to crimp the wire and to simultaneously feed it in its proper path, whereby distortion of the wire is avoided in effecting the crimp-
100 ing of the same, substantially as and for the purposes set forth.

2. A machine for crimping wire, provided with dies having helically-grooved faces for clamping the wire, and adapted to receive an-
105 gular and lateral rectilinear feed motion, in combination with crimping-dies, substantially as and for the purposes set forth.

3. In a machine for crimping wire, a pair of crimping dies in combination with side clamp-
110 ing dies, provided with a screw-motion lateral feed, whereby sufficient wire is fed to said crimping-dies to effect the desired crimp, sub-
stantially as and for the purposes set forth.

4. In a machine for crimping wire, in com-
115 bination with clamping-dies provided with helically-grooved faces, socket-pieces exteriorly provided with screw-threads or studs working in corresponding threads in a casing surrounding said sockets, substantially as and
120 for the purposes set forth.

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Witnesses:

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