P. F. BUTTERFIELD.

WIRE GROOVING MACHINE.

APPLICATION FILED JAN. 19, 1920.

1,386,156. Patented Aug. 2, 1921.

2 SHEETS—SHEET 1.

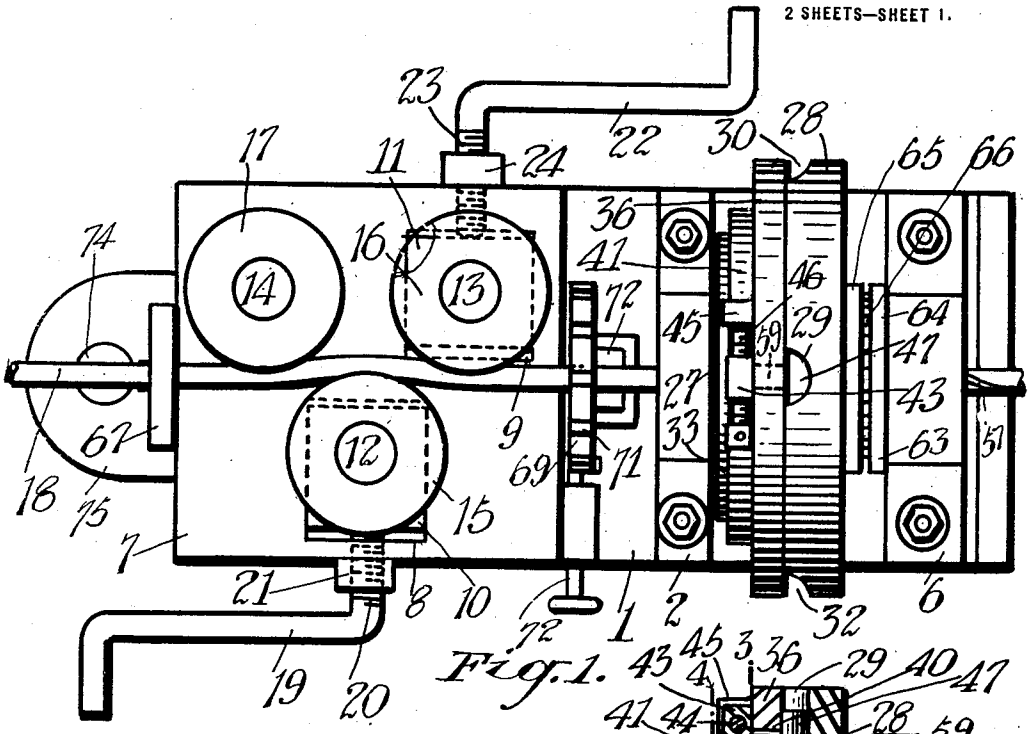


Fig. 1.

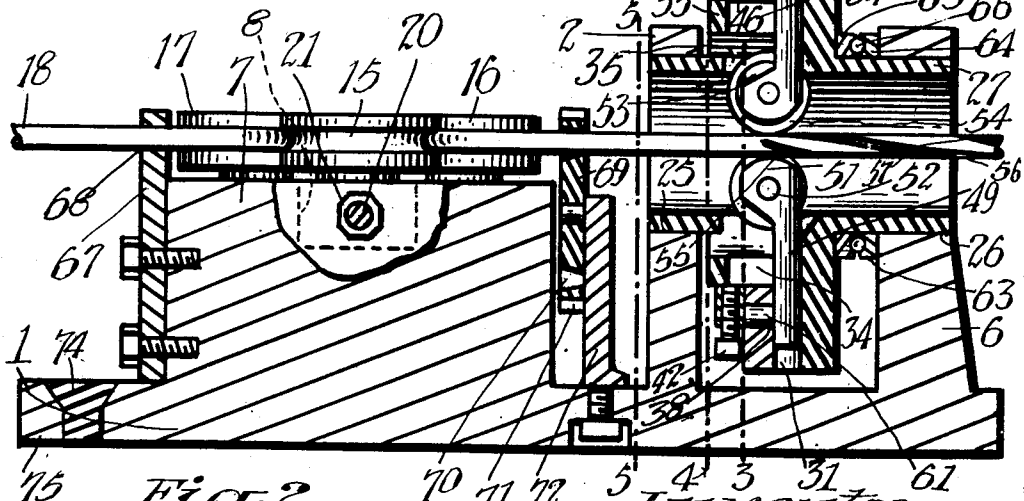


Fig. 2.

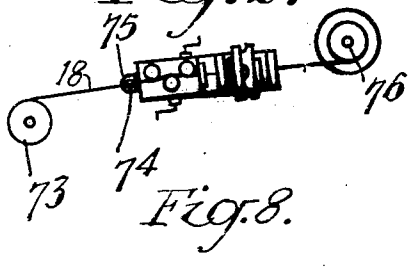


Fig. 8.

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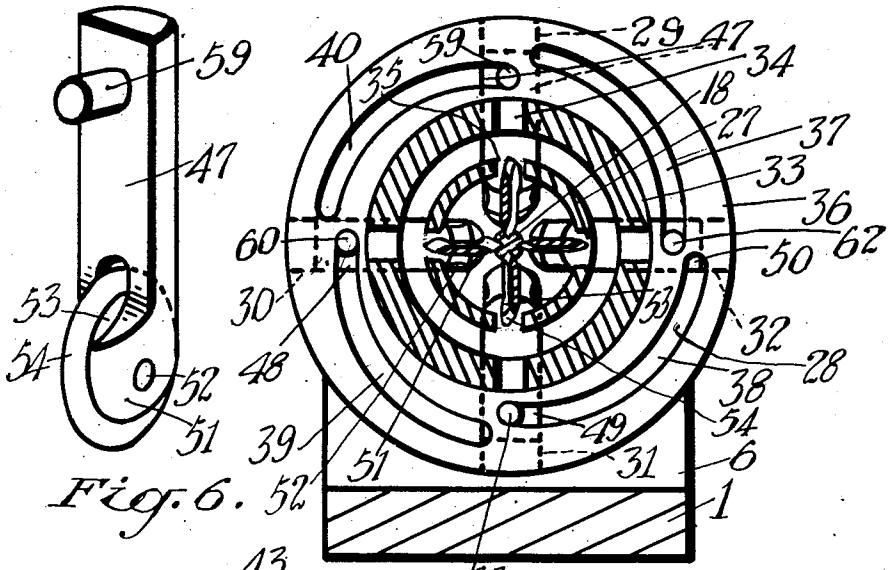


Fig. 6.

Fig. 3.

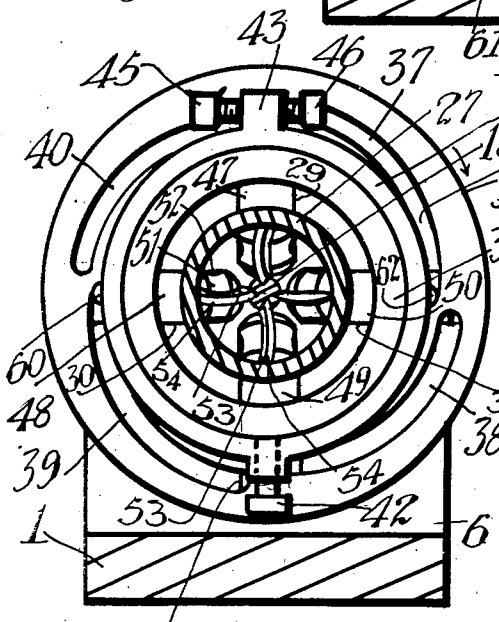


Fig. 4.

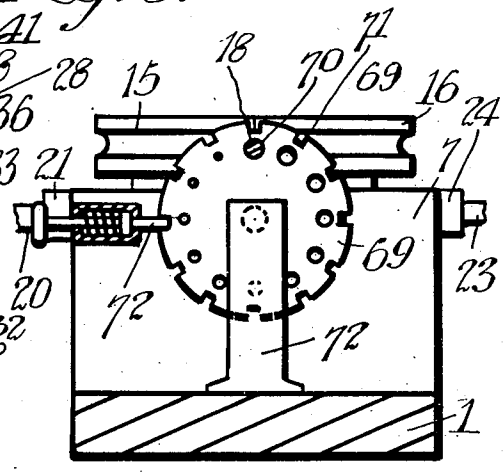


Fig 5

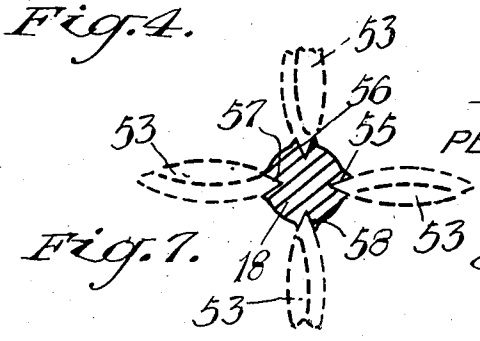


Fig. 7.

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by

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ATTYS

UNITED STATES PATENT OFFICE.

PERCY FREDERICK BUTTERFIELD, OF TORONTO, ONTARIO, CANADA.

WIRE-GROOVING MACHINE.

1,386,156. Specification of Letters Patent. Patented Aug. 2, 1921.

Application filed January 19, 1920. Serial No. 352,398.

To all whom it may concern:

Be it known that I, PERCY FREDERICK BUTTERFIELD, a subject of the King of Great Britain, residing at 116 Maitland street, in the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Wire-Grooving Machines, of which the following is the specification.

My invention relates to improvements in wire grooving machines and the object of the invention is to devise a simple construction of machine which will form a plurality of grooves around a wire preparatory to such wire being formed into nails of the type disclosed in my allowed application, Serial No. 275,974, allowed November 19th, 1919, and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Figure 1 is a plan view of my wire grooving machine.

Fig. 2 is a longitudinal section through Fig. 1.

Fig. 3 is a cross section on line 3—3, Fig. 2.

Fig. 4 is a cross section on line 4—4, Fig. 2.

Fig. 5 is a cross section on line 5—5, Fig. 2, showing the locking plunger also in section.

Fig. 6 is an enlarged perspective detail of one of the grooving members.

Fig. 7 is a further enlarged sectional view through the grooved wire and showing the position of the grooving disks in dotted lines in relation to the wire.

Fig. 8 is a diminutive plan view showing the feed drum and take up drum and my grooving device interposed therebetween and through which the wire passes from the feed to the take up drum.

In the drawings like characters of reference indicate corresponding parts in each figure.

1 indicates the base of my machine which is provided with bearing standards 2 and 6 and a table portion 7. The table portion 7 is provided with rectangular recesses 8 and 9 in which are located slidable blocks 10 and 11. 12 and 13 are studs carried by the blocks 10 and 11 and 14 is a stud carried by the table 7 in the stationary position. The studs 13 and 14 are located at one side of the longitudinal center of the table and the stud 12 on the other side of the center and located intermediately between the studs 13 and 14. 15, 16 and 17 are grooved rollers carried by the studs 12, 13 and 14. 18 is the wire which it is desired to provide with a plurality of spiral grooves extending longitudinally thereof.

19 is a crank provided with a threaded stem 20 which passes through a correspondingly threaded orifice in the outer wall of the recess 8. The inner end of the stem 20 bears against the block 10. 21 is a locking nut adapted to hold the stem in the adjusted position. 22 is a similar crank provided with a threaded stem 23 which passes through the wall of the recess 9 and bears against the block 11. The stem 23 is provided with a locking nut 24. By means of the crank 19 the block 10 and roller carried thereon may be adjusted cross wise of the table 7 so as to force that portion of the wire extending intermediately between the rollers 16 and 17 between such rollers so as to exert a tension on the wire.

In order to prevent the wire being drawn out of center by the pressure of the roller 15 I have made the roller 16 adjustable and after the adjusting of the roller 15 to exert tension the roller 16 is adjusted inwardly toward the center so as to carry that portion of the wire inwardly to maintain it in the central position.

The standards 2 and 6 are provided with bearing orifices 25 and 26. 27 is a sleeve which is turnably held in such orifices. The sleeve 27 intermediately between the standards 2 and 6 is provided with an annular flange 28 provided with radial grooves 29, 30, 31 and 32. The annular flange 28 is provided with an annular laterally extending portion 33 which is concentric with the center of the sleeve 27. Opposite each radial groove 29, 30, 31 and 32 the annular portion 33 is provided with an orifice 34 for a purpose which will hereinafter appear.

The sleeve 27 is also provided with orifices 35 which are radially opposite the orifices 34. 36 is an annular disk which fits around the annular portion 33 so as to be movable thereon, such annular disk being provided with spiral slots 37, 38, 39 and 40 the inner end of each slot being semi-circular and having its center opposite the center

of the corresponding recesses 29, 30, 31 and 32. The opposite end of each slot extends outward into proximity to the inner end of the next adjacent slot. 41 is a ring which also extends around the annular portion 33 and is secured thereon by a locking screw 42. 43 is a lug which extends outward from the ring 41 and is provided with an internally threaded orifice 44. 45 is a lug which extends outward from the annular disk 36. 46 is an adjustable screw which is threaded into the orifice 44 and bears at its end against the lug 45. 47, 48, 49 and 50 are semi-cylindrical bar members each provided at their lower ends with a jaw 51 in which is mounted a bearing pin 52.

It will be noted that the flat face of each bar member is set at right angles to the axis of the machine or the center of the wire 18 and that the jaw members 51 are so formed as to extend at a slight incline to such axis. On each pin 52 is mounted a cutting disk 53 which is provided with a V-shaped cutting edge 54 which is adapted to engage the exterior periphery of the wire 18. I preferably provide four cutting disks 53 so as to form four spiral grooves 55, 56, 57 and 58 as clearly indicated in Fig. 7 of the drawing.

The bar members 47, 48, 49 and 50 are provided with pins 59, 60, 61 and 62 which extend into the spiral slots 40, 39, 38 and 37 as is clearly indicated in Fig. 3. 63 is an end thrust bearing comprising disks 64 and 65 and interposed ball bearings 66.

It will thus be seen that the pull of the wire as it is drawn through the machine carries the device against the thrust bearing which thrust bearing is supported against the standard 6. 67 is a plate which is secured to the outer end of the table 7 and is provided with an orifice 68 by which the wire is guided before it passes between the tension rollers 15, 16 and 17. In order to exactly center the wire as it passes from the tension rollers to between the grooving disks 53 I provide a circular plate 69 which is provided with a series of orifices 70 located in proximity to the periphery thereof such orifices being of such size to accord with the different standard sizes of wire employed. The periphery of the disk 69 is provided opposite each orifice 70 with a notch 71. 72 is a spring held locking plunger which engages the notches 71 so as to hold the disk 69 in the exact position and the desired orifice centered exactly opposite the central point between the cutting disks 53. The disk 69 is supported upon a standard 72 which extends upwardly from the base 1.

In Fig. 8, 73 indicates the feed roller from which the wire 18 passes through my machine which is pivotally supported on a suitable supporting base by a bolt 74 extending through the lug 75 extending from the end of my grooving device adjacent to the feed roller 73. By this means the grooving device may adjust itself so as to feed the wire on the take up roller 76 which is revolved by any suitable means.

The wire is passed through my machine from the feed roller 73 to the take up roller 76 and engages therewith. The adjusting screw 46 is then turned so as to force the disk 36 circumferentially carrying the pins 59, 60, 61 and 62 inwardly toward the end of each slot 40, 39, 38 and 37 and into the position shown in the drawing in which position the peripheral cutting edges 54 of the disks 53 are forced into the wire 18. The take up roller is then revolved drawing the wire through my device the tension device formed by the rollers 15, 16 and 17 serving to hold the wire taut as it passes between the cutting disks 53. As the wire is drawn through, the cutting disks, being set at a slight incline to the longitudinal center of the wire, travel spirally around the wire the sleeve 27 carrying such cutting disk revolving within the orifices 25 and 26 being held in position by the thrust bearing formed by the ball 66 and disks 64 and 65. If it is desired to quickly release the cutting disks 53 from engagement with the wire all that it is necessary to do is to loosen the screw 42 of the ring 41 and the disk 28 may be revolved around in the direction of arrow (see Fig. 4). By this means the pins 59, 60, 61 and 62 are carried radially outward by means of the spiral grooves 37, 38, 39 and 40 which pins, being carried by the bar portions 47, 48, 49 and 50 carry such bar portions also outward and the cutting disks carried thereby out of contact with the wire 18.

From this description it will be seen that I have devised a very simple device whereby wire may have spiral grooves accurately cut therein so that they run parallelly longitudinally of the wire which grooves are formed with outwardly burred edges as fully described in my prior allowed application hereinbefore referred to and from which nails of the type disclosed in such prior application are formed.

What I claim as my invention is:

1. A wire grooving machine comprising a tension device through which the wire is adapted to be drawn and a grooved member engaging the wire and mounted to revolve whereby it may travel spirally around the wire and to be driven by the longitudinal movement of the wire as it is drawn from the tension device while it moves in engagement with such cutting member.

2. A wire grooving machine comprising a tension means through which the wire is adapted to pass, grooving members engaging opposite sides of the wire and mounted to revolve whereby they may travel spirally

around the wire and to be driven by the longitudinal movement of the wire passing therebetween.

3. A wire grooving machine comprising a tension device through which the wire is drawn, a cylindrical member mounted to revolve idly in suitable bearings, and grooving members carried by the cylindrical idler member in engagement with the wire and adapted to travel spirally around the wire as the cylindrical member is rotatably driven by the longitudinal movement of the wire therebetween.

4. A wire grooving machine, comprising a carrier sleeve mounted to freely revolve in suitable bearings and through which a wire is adapted to pass, cutting disks located on opposite sides of the wire and set at such an angle to the longitudinal center of the wire so that the longitudinal draw of the wire upon the cutting disks rotates the sleeve whereby the cutting disks follow a spiral path around the wire.

5. A wire grooving machine, comprising a sleeve free to revolve in bearings and through which a wire is drawn, an annular flange extending from the sleeve having radial grooves formed therein, cutting disks, carrier means for the disks slidably supported within the grooves, and eccentric means rotatably carried for carrying the disks in and out of engagement with the wire.

6. A wire grooving machine comprising a tension device through which the wire is adapted to pass, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, an annular flange extending from the sleeve having radial grooves formed therein, cutting disks, carrier members for the disks slidably supported within the grooves, means rotatable concentric with the sleeve for carrying the cutter disks and the carriers thereof in and out of engagement with the wire, and independent means for releasing such adjustable means so as to simultaneously free the cutting members from the wire.

7. A wire grooving machine comprising a tension device through which the wire is adapted to pass, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, an annular flange extending from the sleeve having radial grooves formed therein, cutting disks, carrier members for the disks slidably supported within the grooves, an annular disk mounted to rotate concentric with the center of the sleeve and provided with spirally set slots, pins extending outwardly from the carrier members into the spiral slots, and adjustable securing means for turning the spirally slotted disk to carry the cutter members into engagement with the wire.

8. A wire grooving machine comprising a tension device through which the wire is adapted to pass, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, an annular flange extending from the sleeve having radial grooves formed therein, cutting disks, carrier members for the disks slidably supported within the grooves, an annular disk mounted to rotate concentric with the center of the sleeve and provided with spirally set slots, pins extending outwardly from the carrier members into the spiral slots, a ring, means for detachably securing the ring in a stationary position in relation to the sleeve, a lug extending outwardly from the ring and an opposing lug extending outwardly from the slotted ring and a set screw extending through one of said lugs into engagement with the other of said lugs.

9. In a wire grooving machine, a tension device, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, cutters held in engagement with the wire and set so as to travel spirally around the wire as it is drawn therebetween, carrying means for supporting the cutting disks upon the freely revolving sleeve, and means for centering the wire as it passes from the tension device to between the cutting disks.

10. In a wire grooving machine, a tension device, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, cutters held in engagement with the wire and set so as to travel spirally around the wire as it is drawn therebetween, carrying means for supporting the cutting disks upon the freely revolving sleeve, a supporting standard, a disk revolubly mounted upon the standard and having a series of holes corresponding to the standard sizes of wire, and means engaging the disk for holding it in any desired position.

11. In a wire grooving machine, a tension device, a sleeve free to revolve in bearings and through which the wire is drawn from the tension device, cutters held in engagement with the wire and set so as to travel spirally around the wire as it is drawn through the freely revolving sleeve, a supporting standard, a disk revolubly mounted upon the standard and having a series of holes corresponding to the standard sizes of wire, and means engaging the disk for holding it in any desired position, and comprising peripheral notches opposite each orifice, and spring plunger means engaging the notches to hold the disk in any desired position.

12. A wire grooving machine comprising a tension device from which the wire is adapted to be drawn, cutting disks arranged on opposite sides of the wire and set at an angle to the longitudinal center of the wire,

and a rotatable idler carrier for the disks adapted to be rotated by the draw of the wire as it passes between the disks in engagement therewith.

13. A wire grooving machine comprising a base pivotally mounted at one end upon suitable supports, a tension device carried at one end of the base and through which the wire is adapted to pass, a carrier, cutting disks carried by the carrier adapted to engage the wire and set at right angles to the longitudinal center of the wire whereby they travel spirally therewith as the wire is drawn longitudinally therebetween.

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