L. FISK.

NOTCHING MEANS FOR WIRE WINDING MACHINES.

APPLICATION FILED FEB. 4, 1910.

991,144.

Patented May 2, 1911.

2 SHEETS—SHEET 1.

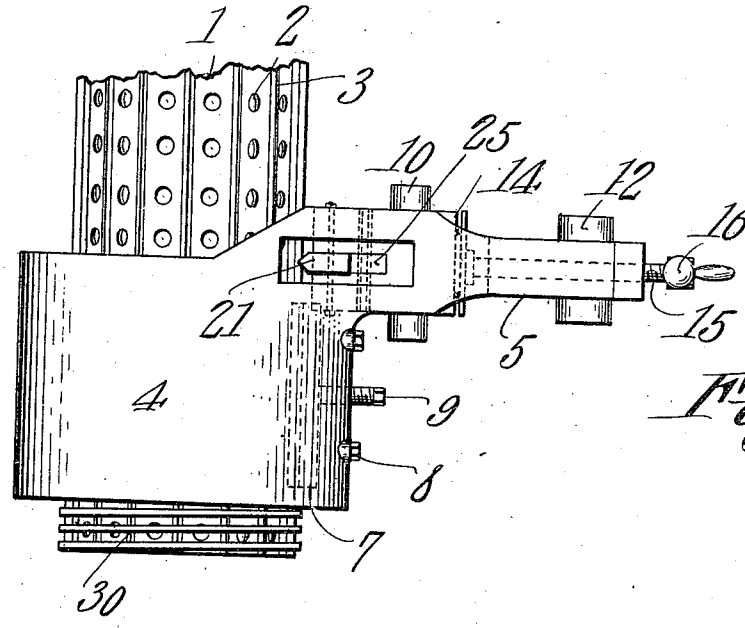

Fig. 1.

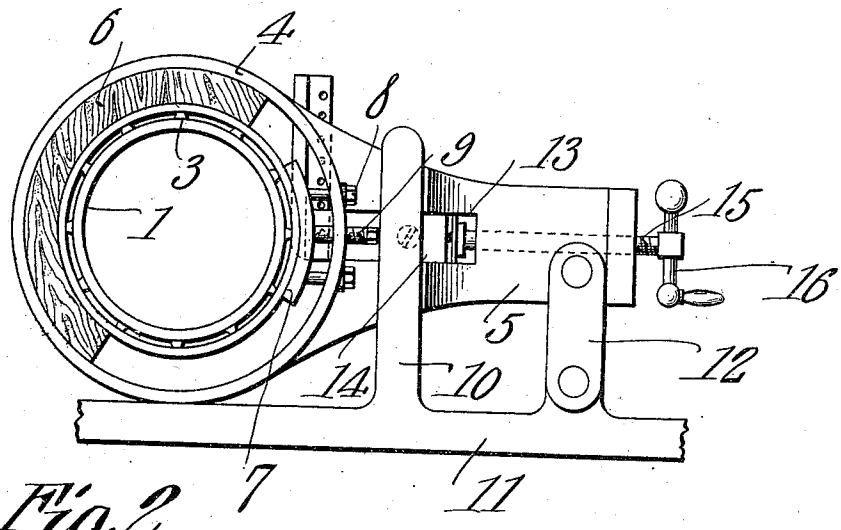

Fig. 2.

Witnesses

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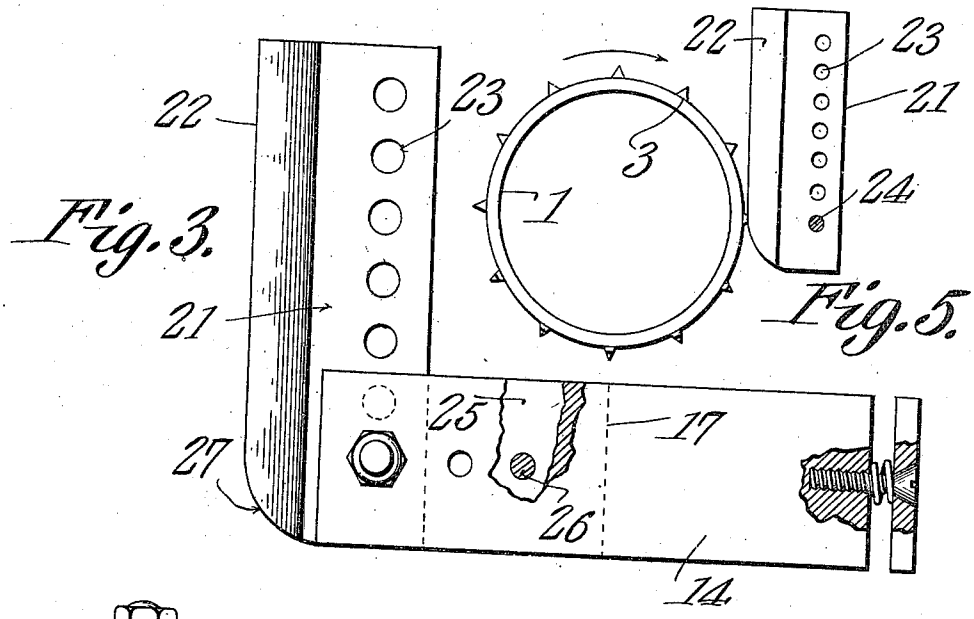

Fig. 3.

Fig. 5.

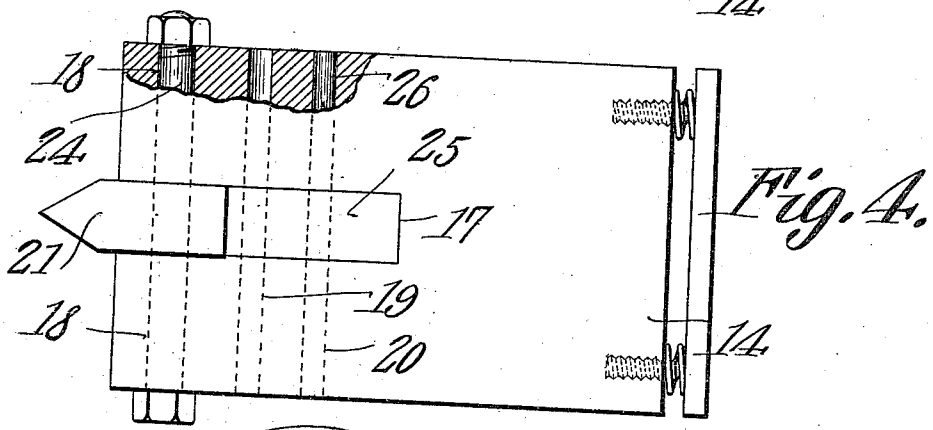

Fig. 4.

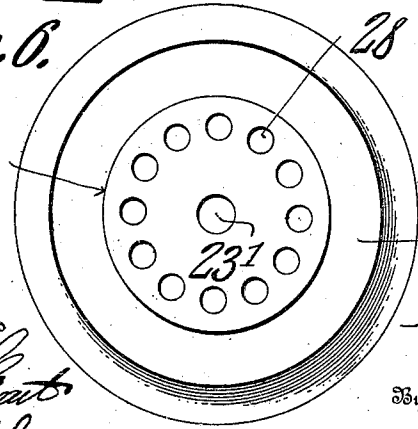

Fig. 6.

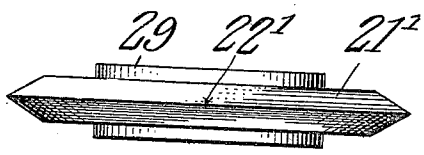

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

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NOTCHING MEANS FOR WIRE-WINDING MACHINES.

991,144. Specification of Letters Patent. Patented May 2, 1911.

Application filed February 4, 1910. Serial No. 541,985.

To all whom it may concern:

Be it known that I, LAWNNEDO FISK, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented a new and useful Notching Means for Wire-Winding Machines, of which the following is a specification.

This invention has reference to improvements in notching means for wire winding machines and is designed to provide a means for the progressive notching of the longitudinal ribs formed on the body of well screens so that a continuous strand of wire of proper shape may be wound about the ribs and lodged in the notches formed therein whereby the turns of the wire throughout the length of the screen are held in proper spaced relation.

The well screen comprises, generally speaking, a perforated tubular body having disposed longitudinally thereon equally spaced radially projecting ribs preferably though not necessarily triangular in cross section with the base resting on the outer surface of the perforated tube, and these ribs are notched so that a layer of wire forming the outer wall of the screen may be wound about the body of the screen with the turns so spaced as to permit fluid exterior to the tube to pass between the turns of the wire and through the perforations in the body of the tube to the interior thereof, but to the exclusion of particles even of comparatively small size which may be present in the fluid exterior to the screen.

In accordance with the present invention the notching of the ribs is performed by a chisel or cutter by rotating the tubular ribbed body so that the ribs engage the chisel or cutter, and at the same time moving the tubular body progressively in the direction of the longitudinal axis thereof so that there is produced a helical series of notches about the body of the screen.

In accordance with the present invention the cutting edge of the tool remains fixed and the tubular body of the screen is rotated. The cutting edge of the chisel is however much longer than is necessary for the proper notching of the ribs and the cutting tool is provided with means whereby it may from time to time be reset to bring fresh portions of the cutting edge into operative relation to the ribs to be operated upon thus greatly prolonging the life of the chisel or cutting tool and rendering it unnecessary to re-sharpen the tool except at comparatively long intervals.

The cutting tool may have a straight cutting edge or a circular cutting edge while the mounting is such that either type of tool may be used and the cutting edge may have portions brought successively into active position from time to time as necessary until the entire cutting edge has been actively engaged when the dull tool may be replaced by a fresh tool and the dull tool may then be sharpened at leisure.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a plan view of so much of a rib notching machine as is necessary for the understanding of the present invention. Fig. 2 is an end elevation of the structure shown in Fig. 1. Fig. 3 is a side elevation of the straight type of cutting tool with the holder therefor and illustrating in dotted lines the manner of applying a rotary form of cutting tool to the same holder. Fig. 4 is a plan view, in part section, of the structure shown in full lines in Fig. 3. Fig. 5 is a structural diagram showing the action of the straight type of cutting tool. Fig. 6 is a side view of the circular type of cutting tool. Fig. 7 is an edge view of the circular type of cutting tool.

The present invention relates more particularly to the notching chisel or cutter and immediate co-acting parts, but it will be understood that the chisel or cutter is mounted on and forms part of a machine capable of handling the well screens during the course of manufacture.

The well screens each comprise a cylindrical body 1 in which are formed longitudinal series of perforations 2 and upon the outer surface of the cylinder 1 are secured a circular series of longitudinal, equally spaced ribs 3, preferably, though not necessarily triangular in cross section with the base adjacent to the surface of the cylinder 1 and the apex outward.

It will be understood of course that the cylinder 1 is suitably mounted on centers for rotation about its longitudinal axis, but as such structure need not differ materially

from that of an ordinary lathe, it is unnecessary to show it in the drawings.

There is provided an annular frame 4 which may be made in one or two parts as desired and this frame is off-set from an arm 5 away from the direction of the relative movement of the frame 4 and tube 1 in the operation of the machine. Housed in the frame 4 on one side thereof is a semi-cylindrical block 6 against which the ribs 3 may rotate, or, as will hereinafter appear, it is the wire which is wound upon the ribs that engages the inner surface of the block 6.

In order to center the frame or annulus 4 upon the wire wrapped tube or cylinder 1 there is opposed to the semi-cylindrical block 6 an arc shaped bearing plate 7, which by means of suitable guide rods 8 and an adjusting screw 9 may be properly set up to the wound tube or cylinder 1 and then locked by the set screw 9, thus maintaining the frame or annulus 4 in proper relation to the tube 1, which relation however should be such that the annulus 4 will move readily along the tube 1 without binding, it being customary to mount the frame or annulus 4 upon the lathe carriage or equivalent structure.

The arm 5 is held between two upright parallel guide posts 10 which serve to receive any side strain and prevent other than the proper feeding movement of the frame 4 along the tube 1. These posts or standards rise from a base 11 which is either secured to or forms part of the lathe carriage and the end of the extension 5 remote from the frame 4 is supported upon links 12 pivoted to the base 11 so as to accommodate the frame 4 to any want of trueness of rotation of the tube 1. The arm 5 is provided with a slot 13 radial to the axis of rotation of the tube 1 and in this slot there is mounted a block 14 capable of movement toward or from the tube housed in the frame or annulus 4. This block 14 is under the control of a feed screw 15 extending through the end of the arm 5 remote from the frame 4 and this screw carries a handle or crank 16 by means of which the screw may be readily rotated. It will be understood that this manner of mounting and adjusting the block 14 is simply illustrative and not mandatory.

The end of the block 14 remote from that engaged by the screw 15 is provided with a longitudinal recess 17 extending back into the block for an appropriate distance and also extending from the top to the bottom of the block. Extending through the portions of the block 14 flanking the recess 17 are matching passages 18, 19 and 20 receding in the order named from that end of the block adjacent to the tube 1.

In the structure shown in Figs. 3, 4 and 5 there is provided a cutting tool 21 of generally rectangular shape with the sides approaching along one longitudinal edge to constitute a cutting face or edge 22. Formed in the body of the cutting tool parallel with the cutting edge is a series of perforations 23 any one of which may be brought in alinement with the perforations 18 through the block 14 and the alined perforations may then be traversed by a bolt 24 holding the cutting tool against movement in the direction of its length. When the cutting tool is properly secured in the block 14 traversing the outer end of the recess 17, there is lodged between the rear edge of the cutting tool and the rear wall of the recess 17 a block 25 provided with a perforation which when the block is in position is in line with the perforations 20 of the block 14 and then the block 25 is held in place in the recess 17 by means of a pin 26 traversing the block 25 and the perforations 20 in the block 14.

One end 27 of the cutting edge 22 of the tool 21 is rounded toward the body of the block, this rounded edge being the lower edge of the cutting tool in the particular arrangement of the parts shown in the drawing.

Instead of using the straight cutting tool 21 shown in Figs. 3, 4 and 5 a circular cutting tool 21′ shown in Figs. 6 and 7 may be substituted for the cutting tool 21, this circular cutting tool having a continuous peripheral cutting edge 22′. At the axis of the cutting tool 21′ there is a perforation 23′ by means of which the tool 21′ may be secured to the block 14 by the bolt 24, the perforation 23′ being brought into alined relation with the perforations 19 and the space in the recess 17 occupied by the block 25 when the cutting tool 21 is employed being now occupied by the cutting tool 21′. Surrounding the perforation 23′ the cutting tool 21′ is provided with a circular series of perforations 28 any one of which may be brought into alined relation with the passages 19 through the block 14 and then the pin 26 may be introduced into and traverse the passages 19 and the particular perforation 28 then in line with the said passages 19. By this arrangement the cutting tool 21′ may be adjusted circularly to as many positions as there are provided perforations 28. It is not necessary that the entire body of the cutting tool 21′ should occupy the recess 17 and so there may be formed on the side faces of the cutting tool 21′ laterally extending hubs 29 designed to engage the side wall of the recess 17.

If now it be assumed that there is mounted in the machine a tube 1 provided with peripheral ribs 3 and that in the particular showing of Fig. 5 the tube 1 be rotating clockwise as indicated by the arrow and that the cutting tool 21 be mounted in the block 14 as shown in Fig. 3 and further that the

block 14 has been fed close enough to the tube 1 so that its cutting edge is within the path traversed by the outer edges of the ribs 3, then the ribs 3 are caused to traverse successively the cutting edge of the tool 21 and have notches formed in these ribs by said cutting edge of the tool. At the same time the cutting tool is fed along the tubular body 1 in the direction of the length thereof thus forming the notches helically about the tubular body. The winding wire indicated at 30 is fed to the ribs 3 immediately subsequent to the notching thereof so that this wire will pass into the interior of the frame or annulus 4 and so form a smooth bearing surface to be engaged by the bearing means within said frame.

Ultimately the cutting edge of the cutting tool where engaged by the ribs 3 becomes dull and then bolt 24 is removed and the cutting tool is readjusted so that the next perforation 23 is brought into coincidence with the passages 18 and the bolt is reinserted and secured so that a new cutting edge is presented to the ribs 3 and the notching may proceed as before. After having readjusted the tool 21 the fresh portion of the cutting edge will act until dull when the tool may be readjusted and this operation may be repeated until the entire edge of the tool 21 has been utilized when the tool may be removed and resharpened.

In the case of the tool 21′ the bolt 24 is not removed but the pin 26 is withdrawn and the tool 21′ is turned on the bolt as an axis until the next perforation 28 in order is brought into coincidence with the passages 19 when the pin 26 is reinserted.

With either tool many adjustments are possible without the necessity of regrinding the tool thus effecting a great saving in both time and labor and this is possible without making the tool at all obtrusively bulky. The circular form of the tool presents a longer available cutting edge than the straight form without exceeding the available space limit.

It will be observed that the cutter is stationary when in action and the ribs move along the cutting edge regularly deepening the notch until the maximum depth is reached thus avoiding any unevenness or imperfection of the notch and thereby avoiding the forcing of the ribs into the holes in the tubular body as may occur with cutters that press or drive or force themselves into the ribs. Any unevenness of the notch causes variations in the spacing of the wire and corresponding imperfections of the finished screen.

Since the improved cutter is rigid and stationary in action and has no bearings there is of course neither friction nor wear of the bearings, which wear causes a variation in spacing and all adjustments for spacing are thus avoided. Because of the progressive relative movement of the cutter across and into the ribs, breakage of the cutter or parts connected thereto as frequently occurs with other forms of cutters, is avoided, nor does the cutter of this invention drag on the ribs and cause the latter to break.

What is claimed is:

1. Notching mechanism for a winding machine comprising an annular frame adapted to engage the work, an arm connected with the frame, means for yieldingly supporting said arm, a tool holder movable on said arm, and a tool adjustably mounted on said tool holder and having an elongated cutting edge.

2. Notching mechanism comprising an annular frame adapted to engage the work and to move relatively thereto in a longitudinal direction, a radially extending arm rigidly connected with said annular frame and having a slot therein, a carriage movable with said annular frame, a link pivotally connected at its lower end with said carriage and pivotally connected at its upper ends with said arm, a pair of parallel rigid standards on said carriage embracing opposite sides of said arm, a tool holder adjustably mounted in the said arm, said tool holder having a vertically extending slot therein, and a tool detachably and adjustably mounted in said slot and having an elongated cutting edge.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

LAWNNEDO FISK.

Witnesses:
D. D. Cooley,
Howard F. Smith.