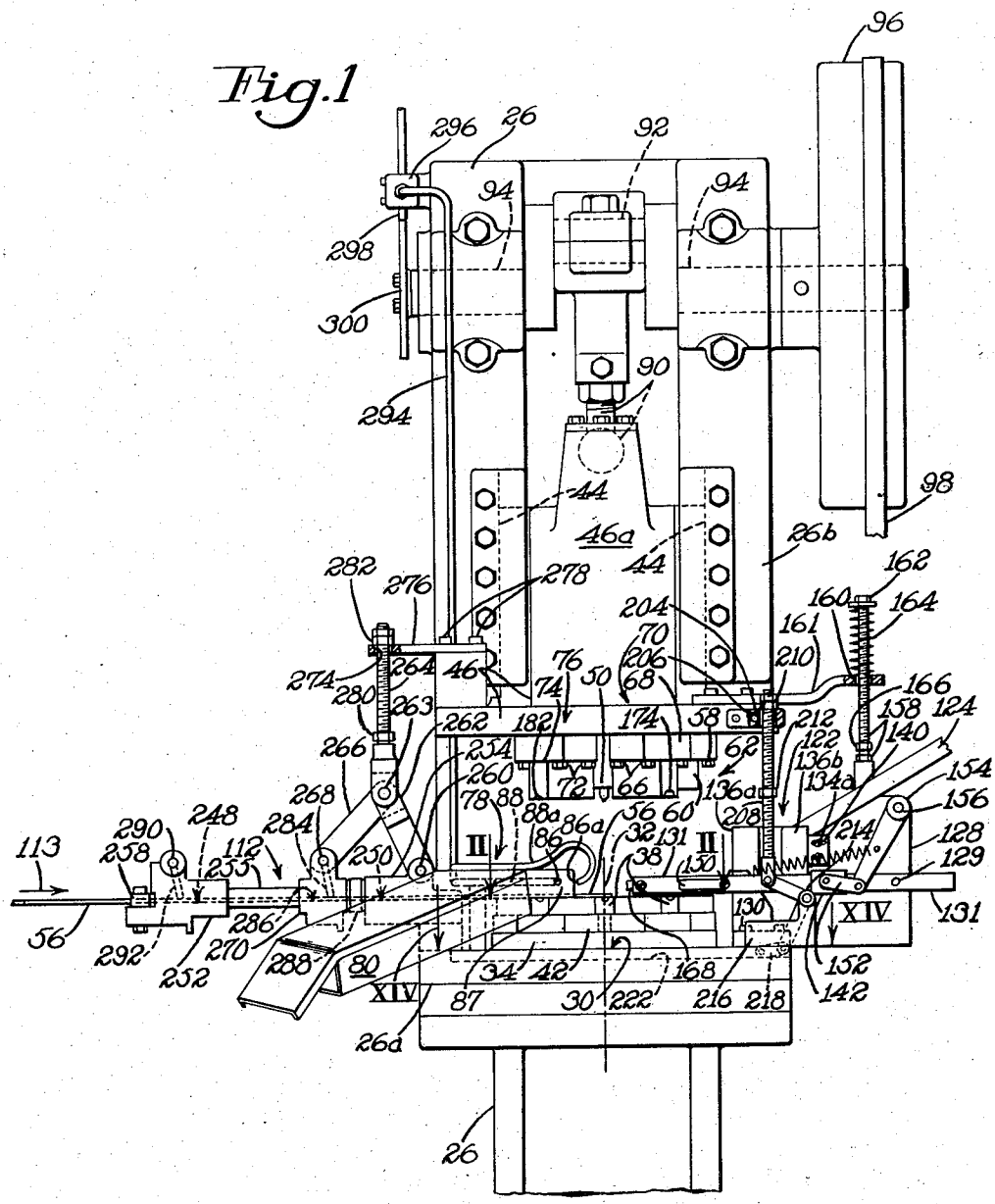
April 7, 1959 F. B. PERRI 2,880,777

MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 1

Fig. 1



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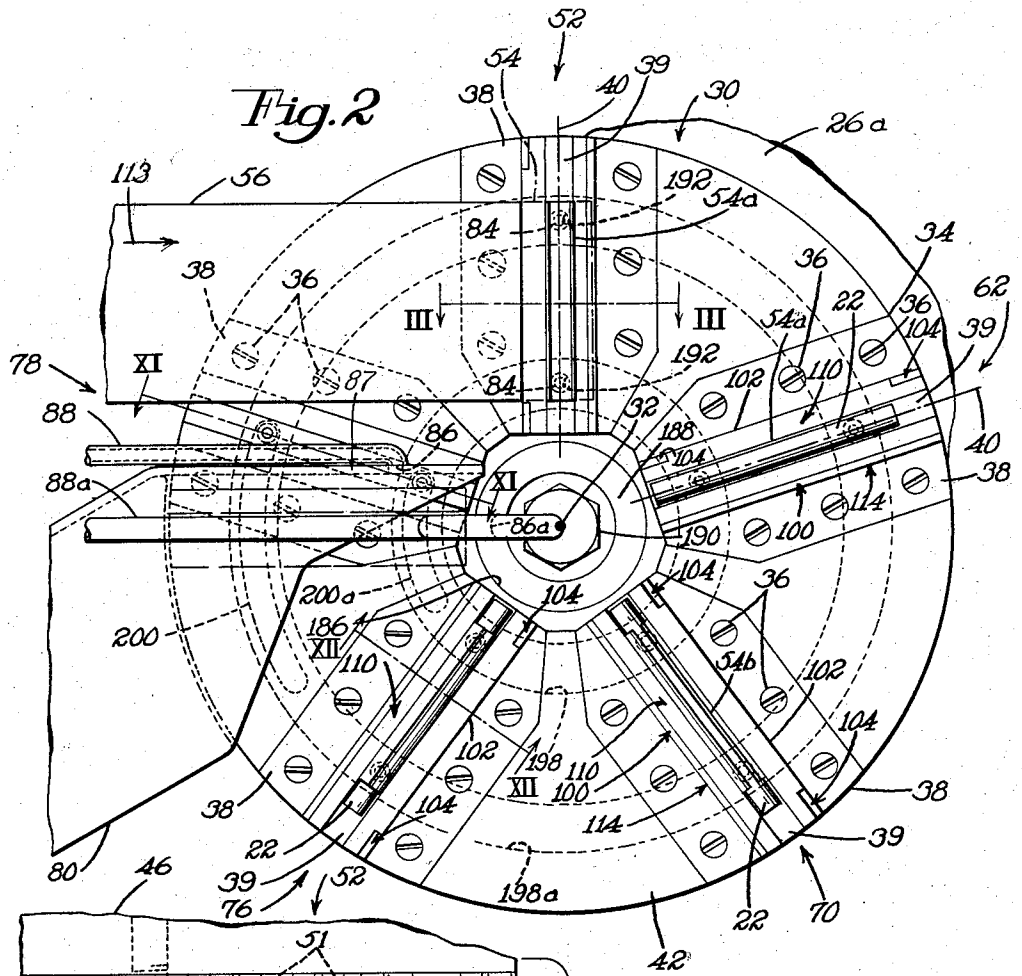
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MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 2

Fig. 2



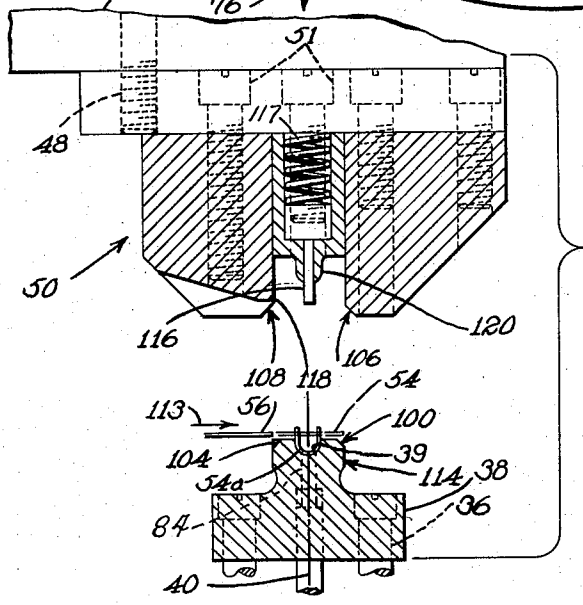


Fig. 3

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April 7, 1959 F. B. PERRI 2,880,777

MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 3

Fig. 5

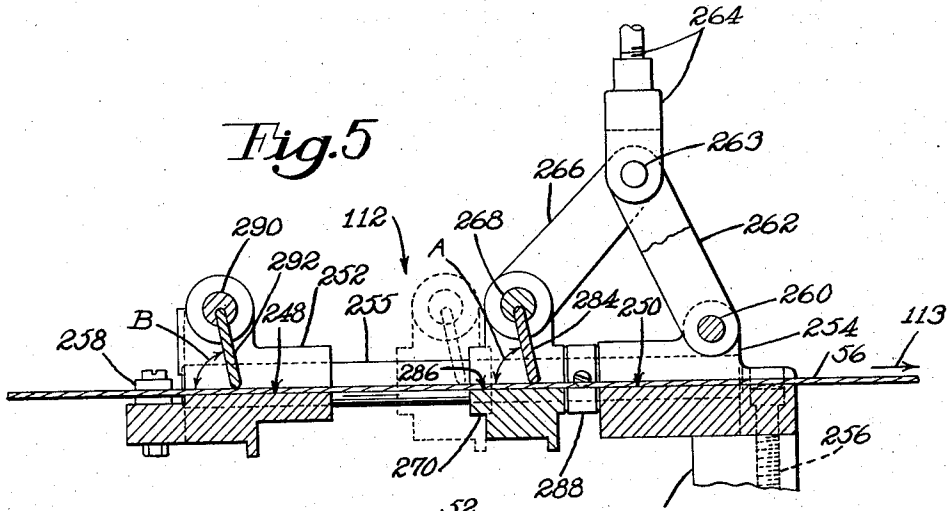
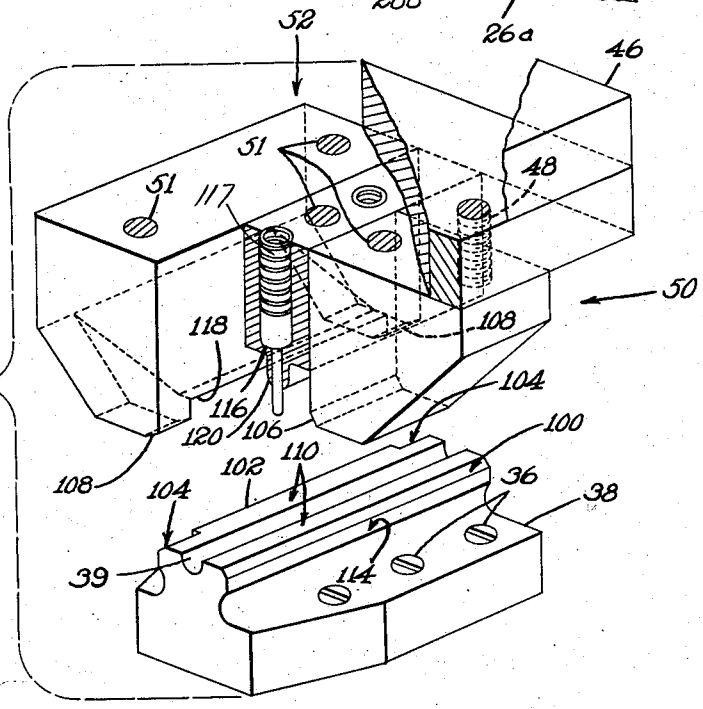


Fig. 4



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April 7, 1959 F. B. PERRI 2,880,777

MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 4

Fig. 6

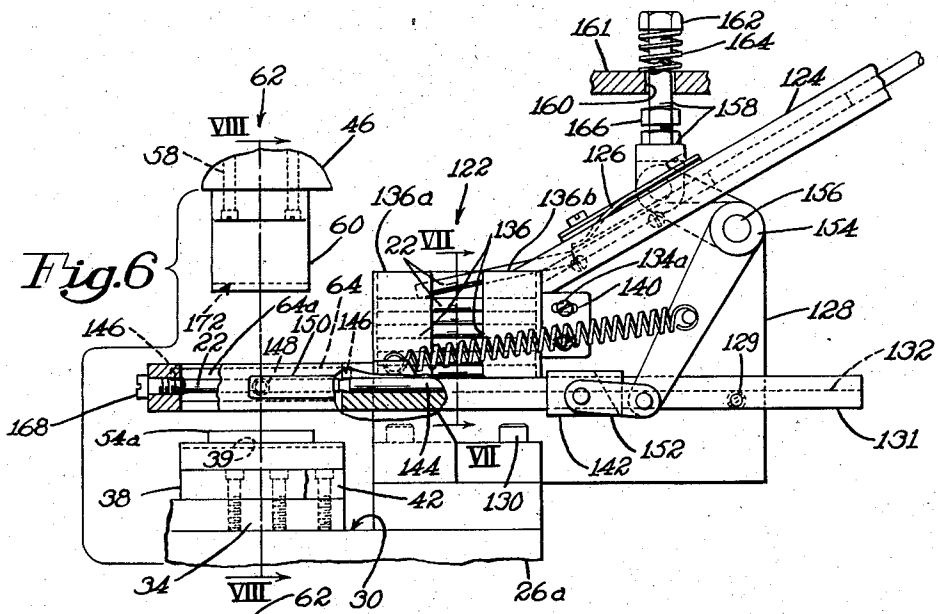


Fig. 7

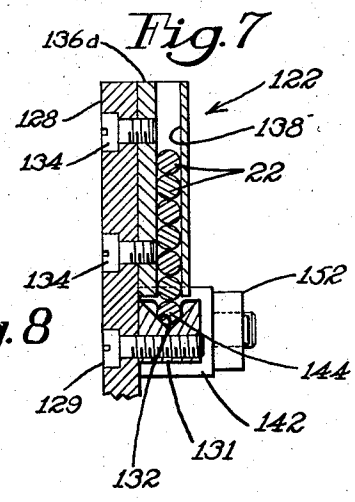
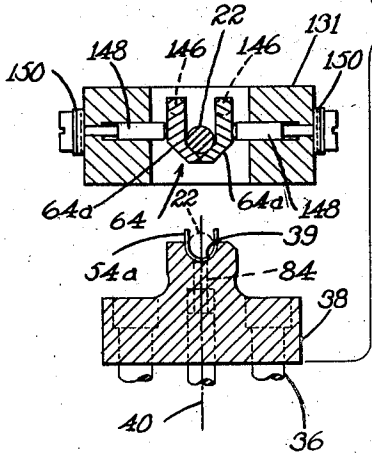


Fig. 8



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April 7, 1959 F. B. PERRI 2,880,777

MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 5

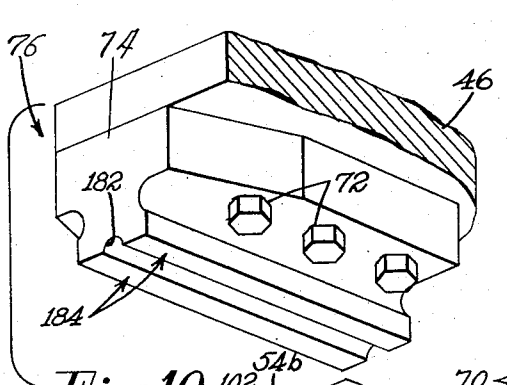


Fig.9

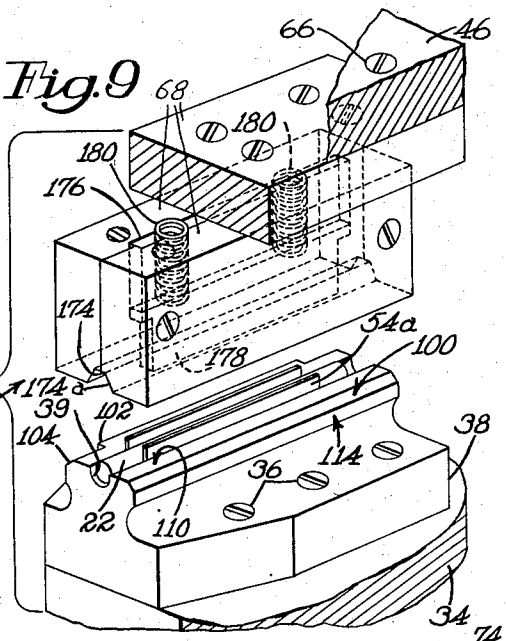


Fig.10

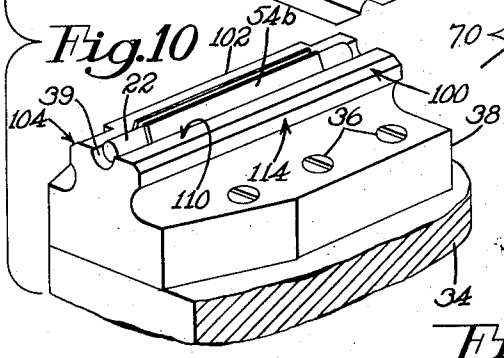


Fig.12



Fig.11

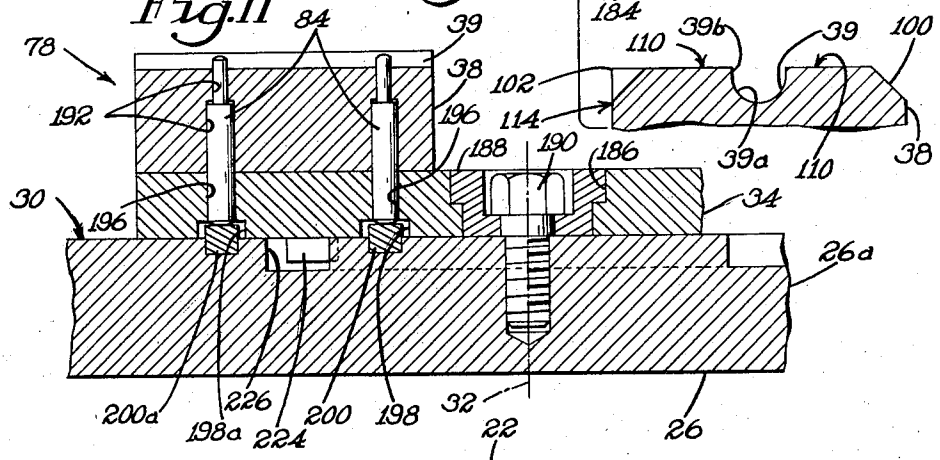
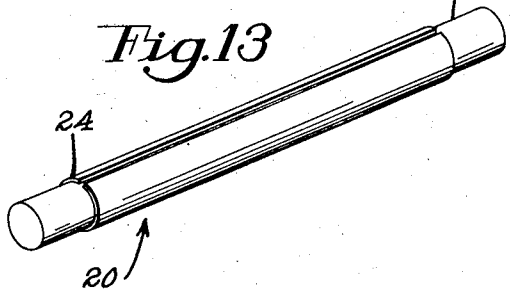


Fig.13



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MACHINES FOR FORMING HEEL REINFORCING DOWELS

Filed April 9, 1956 6 Sheets-Sheet 6

Fig. 14

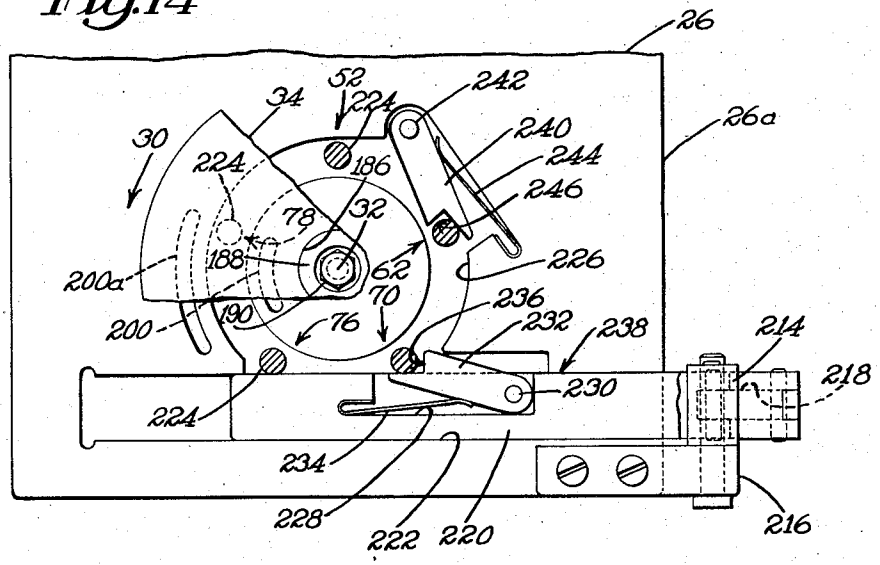
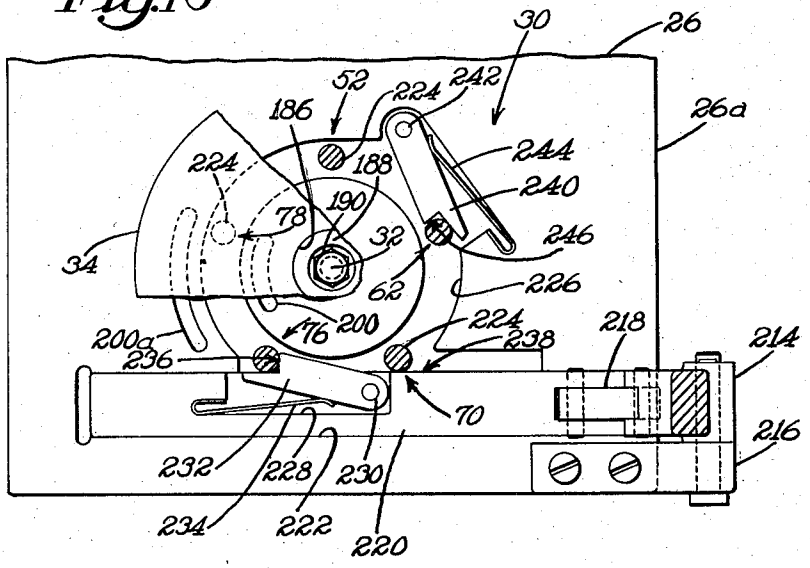


Fig. 15



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United States Patent Office 2,880,777 Patented Apr. 7, 1959

2,880,777

MACHINES FOR FORMING HEEL REINFORCING DOWELS

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Application April 9, 1956, Serial No. 577,105

12 Claims. (Cl. 153—1)

This invention relates to machines for use in the manufacture of dowels which are adapted to reinforce "high style" wood heels and each of which comprises a cylindrical wood core having a thin steel jacket wrapped about and pressed into a lengthwise median portion of its peripheral face, the opposite ends of said jacket being spaced from opposite ends, respectively, of said core.

It is an object of the present invention to provide a machine by the use of which the above dowels may be quickly and effectively partially formed.

The present invention consists in the novel features hereinafter described, reference being had to the accompanying drawings illustrating one embodiment of the same selected for purposes of illustration, said invention being fully described in the following description and claims.

In the drawings,

Fig. 1 is a front view, partly broken away, of a machine in which the present invention is embodied;

Fig. 2 is a view on the line II—II of Fig. 1 showing in plan a turret of the machine and a portion of a chute into which metal jacketed wood core dowels formed by the machine are ejected by high pressure air from jets, four of five dies, which form part of the turret and are progressively indexed to different operating stations, being illustrated with work positioned in them;

Fig. 3 is a transverse vertical section, partly on the line III—III of Fig. 2, showing a cutting and bending tool or punch and one of the dies of the turret just after a metal blank has been bent to a U-shaped cross section at a cutting and bending station of the machine;

Fig. 4 is a perspective view, partly broken away and partly in section, of the tool and the die illustrated in Fig. 3;

Fig. 5 is a longitudinal section through mechanism for intermittently feeding a strip of metal to a predetermined position over the dies successively moved to the cutting and bending station;

Fig. 6 shows, in side elevation but partly broken away, at a core inserting station, a magazine into which wood cores are fed, a tray, mechanism for transferring the cores successively from the magazine to the tray, a core inserting tool and a die in a cylindrical recess of which is positioned a U-shaped metal blank into which the wood core in the tray is to be inserted by said tool;

Figs. 7 and 8 are sections on the lines VII—VII and VIII—VIII, respectively, of Fig. 6;

Figs. 9 and 10 are perspective views of dies of the turret and associated tools or punches which are secured to a vertically reciprocable carrier and are adapted to cooperate with the dies, respectively, in the turning and closing, at blank margin inturning and closing stations, of lateral projecting margins of the U-shaped blank against the wood core which is in said blank;

Fig. 11 is a section on the line XI—XI of Fig. 2 showing portions of the turret and a turret supporting table portion of the main frame of the machine;

Fig. 12 is a view, partly on the line XII—XII of Fig. 2 showing details of construction of one of the dies and of the punch or tool at the blank margin closing station, there being no work shown in the die;

Fig. 13 is a perspective view of the jacketed wood core dowel produced by the use of the illustrative machine; and

Figs. 14 and 15 are sections on line XIV—XIV of Fig. 1 illustrating different positions of certain of the parts.

The illustrative machine is described with reference to forming a dowel **20** (Fig. 13) which is used for reinforcing wood heels (not shown) and comprises a wood core **22** and a thin steel jacket **24** which is tightly wrapped around a lengthwise median portion of the core and is spaced from opposite ends of the core leaving unjacketed portions of said core at opposite ends.

The machine comprises a main frame **26** (Fig. 1) having a table, table portion or support **26***a* (Fig. 2) upon a flat upper face **30** of which is rotatably mounted for movement about an axis **32**, a turret **34** having identical dies **38** secured to it by screws **36**. The dies **38**, which may be regarded as constituting part of the turret **34** and are equally spaced from one another circumferentially around said turret, have formed in them, respectively, longitudinally extending semi-cylindrical recesses **39** which extend radially of the axis **32** of the turret, said axis being included by the median heightwise planes **40** (Figs. 2, 3 and 8), respectively, of the dies. The turret **34** also includes filler pieces **42** (Figs. 1, 2 and 6) which are made of wood and are screwed to the turret and which have their upper faces in alinement with upper faces of base flanges of the dies **38**.

The main frame **26** of the machine also comprises an upstanding portion **26***b* (Fig. 1) provided with a vertical guideway **44** in which reciprocates a bearing flange **46***a* of a carrier **46** having secured to it by screws **48** (Figs. 3 and 4) a multipart cutting and bending or trimming and conforming punch or tool **50** various parts of which are held together by screws **51**. The punch or tool **50** is adapted to cooperate successively with dies **38** indexed to a cutting and bending or trimming and conforming station **52** to bend thin flat steel blanks **54** (Figs. 2 and 3) trimmed from a steel strip **56** and overlying the die at this station to a U shape or to a shape in which the bent blank, identified by reference numeral **54***a*, has a transverse cross section of the general shape of the letter U.

The carrier **46** also has secured to it by screws **58** (Figs. 1, 6 and 8) a core inserting tool or plunger **60** which is positioned at a core inserting station **62** where the wood core **22**, which has been delivered to a two-part tray **64**, is pressed by the plunger **60** into a bight portion of the U-shaped blank **54***a* resting in the semi-cylindrical recess **39** of the die **38** at this station. The carrier **46** also has secured to it by screws **66** (Figs. 1 and 9), a multipart inturning punch or tool **68** which operates at a blank margin inturning station **70** and cooperates successively with the dies **38** indexed to this station to bend the up-standing lateral margins or ends of the U-shaped blank **54***a* toward each other and toward the core **22** in the blank whereby to form a blank **54***b* (Figs. 2 and 10). Also secured to the carrier **46** by screws **72** is a closing punch or tool **74** (Figs. 1, 10 and 12) operative at a blank closing station **76** and adapted to cooperate successively with the dies **38** indexed to this station to close the lateral margins of the blank **54***b* onto the wood heel core **22** in the blank and thus to form the jacketed core **20**.

As the dies **38** are indexed from the blank closing station **76** to an ejecting station **78** adjacent to a chute **80** (Figs. 1 and 2), the jacketed dowels **20** are partially raised in the semi-cylindrical recesses **39** of the dies by mechanism hereinafter described and comprising stripper

pins 84 (Figs. 2, 8 and 11). Upon arrival of the dies at the ejecting station high-pressure air from a jet or nozzle 86 (Figs. 1 and 2) in a wall 87 of the chute and a jet or nozzle 86*a* supplied by lines 88, 88*a*, respectively, and directed against the dowels, causes said dowels to be moved into the chute from which they fall by gravity into a barrel (not shown). As the turret 34 is indexed the dies 38 pass under the wall 87 of the chute 80 thus insuring that the dowels 20 shall be knocked off said dies in the event that they are not ejected from the associated dies by the above-mentioned pneumatic means.

The bearing flange 46*a* of the carrier 46 is universally connected to a connecting rod 90 (Fig. 1) mounted on a crank 92 of a horizontal shaft 94 journaled in bearings in the upstanding portion 26*b* of the main frame 26, and secured to the right end of the shaft (Fig. 1) is a combined flywheel and pulley 96 which is driven by a belt 98 operatively connected to a motor (not shown) controlled by a switch (not shown).

Each of the dies 38 has a lateral bevel 100 extending the full length of the die and a shearing edge 102 at opposite ends of which are formed lateral bevels 104. The punch or tool 50 comprises median and end bevels 106, 108, respectively, which, during downward movement of the carrier 46, cooperate with the bevels 100, 104 of one of the dies at the cutting and bending station 52 to orient to an exact indexed position circumferentially of the axis 32 the turret 34 which is moved approximately to its desired indexed position by mechanism hereinafter described.

As each of the dies 38 is indexed 72° to the cutting and bending station 52 the steel strip 56 is fed over the upper faces 110 of this die by a feeder 112 (Figs. 1 and 5) hereinafter described and adapted, during upward or retractive movement of the carrier 46, to advance the strip in a direction 113 over the die approaching the cutting and bending station, the strip being fed to a position in which a leading edge thereof is moved approximately into vertical alinement with a face 114 of the die indexed to said cutting and bending station. As the carrier 46 is depressed or moved to a projected position a pair of yieldable or spring-pressed retaining pins 116 (Figs. 3 and 4), which are biased by springs 117 and are hereinafter referred to, force the end portion of the steel strip 56 against the upper faces 110 of the adjacent die 38 and a shearing edge 118 of the punch cooperates with the shearing edge 102 of the die to trim the flat steel blank 54 from the strip. A semi-cylindrical bulger, former or former portion 120 of the punch or tool 50, beyond which portion the pins 116 project, then forces the median longitudinal portion of the blank into the semi-cylindrical recess 39 of the associated die 38 to form the U-shaped blank 54*a*, a lower or bight portion of the U-shaped blank being conformed to the semi-cylindrical recess and the lateral margins of the blank extending upward in substantially parallel relation beyond the faces 110 of the die. The bulger 120 may be described as being smaller than the recess 39 and as having a shape generally complemental to said recess.

The wood cores 22 are delivered to a magazine 122 (Figs. 1, 6 and 7) at the dowel inserting station 62 from a tube 124 connected to a hopper (not shown), the cores which slide down said tube being slowed down just before they enter the magazine by a leaf spring 126 which bears against said cores. The magazine 122 comprises a main casting 128 which is secured by screws 130 to the table portion 26*a* of the main frame 26 and has secured to it by screws 129 a guide bracket 131 an upper face of which has a V-shaped core receiving channel 132. Secured by screws 134 (Fig. 7), 134*a* (Figs. 1 and 6) to the main casting 128 of the magazine 122 are rear and forward U-shaped portions 136*a*, 136*b*, respectively, of a holder 136 (Fig. 6) forming a vertical stacking passage 138 (Fig. 7) which overlies and is in register with the V-shaped core receiving channel 132 of the guide bracket 131. It is desirable that the passage 138 of the holder 136 shall be slightly longer than the dowel core 22 to be accommodated and accordingly the forward portion 136*b* of the holder is initially adjustable on the main casting 128 toward and away from the rear portion 136*a* of the holder, elongated slots 140 through which the screws 134*a* pass being provided for this purpose.

Slidingly mounted on the guide bracket 131 is a slide 142 having welded to it a rammer 144 which lies in the V-shaped channel 132 of the bracket and is adapted, when moved to the left to its position shown in Fig. 6, to move the wood core 22, which, during retraction of the rammer has dropped from the magazine 136 into said V-shaped channel, into the closed two-part tray 64 which is supported by the bracket 131 and is in alinement with the channel 132. The tray 64 comprises opposed halves 64*a* having at their ends trunnions 146 mounted in alined bores of the bracket 131. The opposite halves 64*a* of the tray 64 are constantly urged toward each other to their closed or core retaining positions best shown in Fig. 8 by pins 148 which fit slidingly in alined bores of the bracket 131 and are forced against respective halves of the tray by associated leaf springs 150. The tray 64 may be described as comprising opposite longitudinal parts mounted for movement toward and away from each other.

The slide 142 has pivotally connected to it a link 152 pivoted to one arm of a bell crank lever 154 journaled on a bearing screw 156 secured to the main casting 128 of the magazine 122. Pivotally connected to the other arm of the bell crank lever 154 is a multipart rod 158 passing through a bore 160 in a plate portion 161 of the carrier 46 and having threaded onto its upper end a nut 162, a spring 164 being mounted on the rod and interposed between the nut and said plate portion of the carrier, the construction and arrangement being such that when the carrier is moved with relation to the turret 34 from its raised or retracted position to its lower or projected position the carrier engages a nut 166 which is threaded onto the rod to move the rammer 144 to a retracted position in front of an end of the wood core 22 which has just fallen into the channel 142 from the magazine 136. When the carrier 46 is moved back to its raised or retracted position the bell crank lever 154 is swung clockwise, as viewed in Fig. 6, causing the dowel core 22 in the channel 132 to be moved onto the tray 64 until the leading end of said core engages a stop screw 168 threaded into the jacket. When the wood core 22 has engaged the stop screw 168 clockwise movement of the bell crank lever 154 ceases, further upward movement of the carrier causing the spring 164 to be compressed. Screws 168 of different lengths may be used to accommodate cores 22 of different lengths.

The core inserting tool or plunger 60 has a concave semi-cylindrical lower end or work-engaging face 172 which is adapted to receive a portion of said core and may be said to be trough-shaped. When the wood core 22 has been transferred to the tray 64 the plunger 60, during the next downward stroke of the carrier 46, depresses said core causing the opposite halves 64*a* of the tray to be swung apart under pressure against the action of the spring-pressed pins 148 and forces said core into the U-shaped blank 54*a* then in the die 38 at the dowel inserting station 62 and against the bight portion of the blank to its dash-line position shown in Fig. 8. Each of the semi-cylindrical recesses 39 of the dies 38 has a cross section comprising a semicircular portion 39*a* (Fig. 12) and parallel upper side portions 39*b* extending above and continuous with said semicircular portion. By providing a recess 39 of this type the U-shaped blank 54*a* does not have a tendency to spring out of the recess.

The upstanding lateral margins of the U-shaped blank 34*a* are inturned toward each other around the core 22 to form the blank 54*b* at the blank margin inturning station 70 by the punch or tool 68 which has a recess 174

(Figs. 1 and 9) comprising substantially flat or end beveled sides 174*a*. In order to insure that the core shall be forced against the bight portion of the bent blank 54*a* arranged in the recess 39 of one of the dies 38 as the laterally projecting margins of the blank are inturned toward each other by the inturning punch 68, this punch has yieldably slidable in a slot 176 (Fig. 9) thereof a presser bar 178 which is constantly urged to a predetermined stop position into the recess 174 of this tool by a pair of springs 180 which are housed in bores formed by portions of the punch 68 and upper ends of which bear against another part of the punch. As the inbeveled sides 174*a* of the recess 174 of the punch 68 bend the lateral margins of the U-shaped blank 54*a* toward each other to form the inturned blank 54*b*, the presser bar 178 yieldingly forces the core 22 against the bight portion of this blank.

The inturned lateral margins of the U-shaped blank 54*b* are fully closed onto the core 22 at the closing station 76 by the closing punch or tool 74 which has a partly cylindrical recess 182 (Figs. 1, 10 and 12), the construction and arrangement being such that the leading faces 184 of the punch 74 are in close proximity to the faces 110 of the associated die 38 when the blank 54*b* is firmly closed in the form of the jacket 24 around the wood core.

The turret 34 is slidingly supported upon the flat upper face 30 of the table portion 26*a* of the main frame 26 and is provided with a stepped recess 186 (Figs. 2, 11, 14 and 15) adapted to receive a stepped bronze bearing 188 which is secured in position upon the table by a screw 190 threaded into the table and having its head clamped against the bearing. Each of the dies 38 has formed in it a pair of vertical bores 192 which open into the recess 39 of the die and are adapted to receive the stripper pins 84, said pins being reciprocable in said bores 192 and in alined bores 196 formed in a main casting of the turret 34. The bottom face of the main casting of the turret 34 has formed in it inner and outer concentric channels 198, 198*a* in which the lower ends of the vertical bores 196 open and secured to the upper face of the table portion 26*a* of the main frame 26 between the blank closing station 76 and the dowel ejecting station 78 are inner and outer arcuate cams 200, 200*a* which extend, respectively, into said channels. During clockwise rotation of the dies 38 of the turret, as viewed from above, between the ejecting station 78 and the blank closing station 76 the lower ends of the stripper pins 84 guided in the bores 192, 196 engage the flat upper face 30 of the table portion 26*a* of the main frame 26, the upper ends of said pins at this time being withdrawn from associated semi-cylindrical recesses 39 of the dies. During movement of the dies 38 between the blank closing station 76 and the ejecting station 78 the stripper pins 84 associated with these dies ride up the cams 200, 200*a* and are thus forced into the semi-cylindrical recesses 39 of the associated dies with the result that the jacketed dowels 20, which have been formed in the dies, are forced partially out of said recesses.

The five dies 38 of the turret are simultaneously indexed 72°, respectively, between the five adjacent pairs of operating stations in response to elevation of the tool carrier 46 away from the turret 34 by the following mechanism. Secured to the carrier 46 is a boss 204 (Fig. 1) having extending vertically through it a bore 206 for slidingly receiving a loose fitting rod 208 to which are secured upper and lower nuts 210, 212, respectively. Pivotally connected to the lower end of the rod 208 is one arm of a bell crank lever 214 (Figs. 1, 14 and 15) journaled on a lug 216 secured to the table portion 26*a* of the main frame, the second arm of said lever being operatively connected by a link 218 to a slide 220 reciprocable in a guideway 222 of said table portion.

As above explained, the turret 34 is supported upon the flat upper face 30 of the table portion 26*a* of the main frame 26 and is journaled upon the stepped bearing sleeve 188 which is held in position by the screw 190 secured to said table portion, the turret having secured to it five circumferentially spaced depending studs 224 projecting into a groove 226 which is formed in the upper portion of said table portion and a major part of which is circular. The slide 220 has formed in it a recess 228 which is adapted to receive the depending studs 224 and in which is journaled on a bearing pin 230 secured to the slide a pawl 232 constantly urged rearward by a leaf spring 234, the pawl at all times being in engagement with one of the depending studs 224 of the turret 34. When the carrier 46 is fully depressed the boss 204 secured to the carrier is in forced engagement with the lower nut 212 on the rod 208, the slide 220 at this time being in a retracted position in the guideway 222 as shown in Fig. 14. When the carrier 46 has been raised to a position in which the dowel inserting tool or plunger 60 secured to the carrier 46 has been moved to a position well above the tray 64, the boss 204 engages the nut 210 causing the bell crank lever 214 to be swung clockwise, as viewed in Fig. 1, with the result that the slide 220 is moved in the guideway 222 to the left to a projected position shown in Fig. 15. As the slide 220 moves to its projected position a face 236 of the pawl 232 engages the adjacent stud 224 causing the turret 34 to be rotated clockwise 72°, as viewed from above, clockwise rotation of the turret being limited by the engagement of the stud 224, which follows the stud engaged by the pawl, with a side face 238 of the slide 220.

When the carrier 46 reaches the upper end of its travel and the slide 220 accordingly reaches the end of its indexing movement to the left, as shown in Fig. 15, a pawl 240, which is pivoted on a pin 242 secured to the table 26*a* of the main frame 26 and is constantly urged clockwise by a spring 244, has moved behind an oncoming stud 224, thus insuring against any substantial backward movement of the indexed turret 34. Between the time that the slide 220 has completed its indexing movement and the carrier 46 has been moved downward to an extent sufficient to cause the boss 204 to engage the nut 212, the slide has a slight dwell and as the rod 208 is thereafter lowered by reason of the action of the boss on this nut, the slide is moved backward to its retracted position, shown in Figs. 1 and 14, the pawl 232 during such movement being forced yieldingly against the stud which has just been in engagement with the face 238 and during this time the next following stud is held against a face 246 of the pawl 240. Before the slide 220 reaches its starting position shown in Fig. 14, in which position the stud 224 just engaged by the pawl 232 is arranged opposite the recess 228 of the slide, the bevel faces 106, 108 of the punch 50 are in engagement with the bevel faces 100, 104, respectively, of the associated die 38 at the cutting and bending station 52, causing the turret 34 to be accurately positioned so that the various tools secured to the carrier cooperate effectively with the associated dies, respectively, of the turret simultaneously to carry out the above described step operations on the work at the different stations. In order to allow the carrier 46 to continue its upward movement after one of the studs 224 has engaged the face 238 of the slide 220 and thus to facilitate the initial setting up adjustment of the machine, a spring (not shown) corresponding to the spring 164 may be positioned around the rod 208 and interposed between the boss 204 and the nut 210.

The steel strip 56 is fed in the direction 113 (Figs. 1, 2, 3 and 5) from a roll (not shown) and rests upon the upper faces 248, 250 (Figs. 1 and 5) of bracket portions 252, 254 of the feeder 112. The bracket portion 254 of the feeder 112 is secured to the table portion 26*a* of the frame 26 by screws 256, the bracket portion 252 being secured to a pair of bearing shafts 255 which are fixed to said bracket portion 254. The strip 56 is

positioned widthwise on the faces 248, 250 by rolls 258 which are mounted for initial adjustment toward and away from each other on the bracket portion 252.

Fulcrumed on a pin 260 fixed to the bracket 254 is an arm 262 the upper end of which is pivotally connected by a pin 263 to an operating rod 264 and to the upper end of an arm 266 having its lower end journaled on the middle of a pin 268 opposite ends of which are pivotally mounted in bearings of a feed block 270 slidingly mounted on the bearing shafts 255. The rod 264 extends upward through a bore 274 in a plate 276 secured by screws 278 to the carrier 46 and threaded onto the rod is a pair of nuts 280, 282 which are adapted to be engaged, respectively, by the plate to lower and raise the rod. Secured to the pin 268 is a feed plate 284 the lower end of which rests against a portion of the strip 56 supported by a longitudinal strip supporting face 286 of the block, said blade being inclined downward in the direction of feed of the strip at an angle A of about 80° to the face 286 of the block, the feed block 270 when the carrier is in its raised or retracted position being arranged in close proximity to collars 288 which may be initially secured in different positions to the bearing shafts 255 and one of which is shown in Fig. 5.

Fulcrumed in spaced bearing bosses of the bracket 252 is a pin 290 having secured to it a stop plate 292 which at all times bears against the metal strip 56 and is inclined downward in the direction of feed of the strip at an angle B to the strip supporting face 248 of the bracket.

When the carrier 46 is in its raised position the forward end of the metal strip 56 lies above and is substantially in alinement with the face 114 of the die 38 indexed to the cutting and bending station 52. As the carrier 46 is lowered the plate 276 secured to the carrier moves downward along the rod 264 until the nut 280 on the rod is engaged by said plate, continued downward movement of said carrier and accordingly of the rod thereafter causing the arms 262, 266, which may be described as constituting a toggle, to move the feed block 270 to its dash-line position on the guide shafts 255, the feed blade 284, because of its angular relation to the strip, being dragged lightly over the strip which at that time is held against retraction by the stop blade 292.

As above explained, during downward movement of the carrier 46 the steel blank 54 is formed at the cutting and bending station 52 from the strip 56. During a portion of the movement of the carrier 46 to its raised position the nut 282 on the rod 264 is engaged by the plate 276 causing the toggle formed by the arms 262, 266 to be closed and accordingly the feed block 270 to be moved to the right (Figs. 1 and 5) to its full-line position and accordingly causing the feed bar 284 to move the metal strip 56 a predetermined distance, depending upon the position of the nut 282 on the rod 264, in the direction 113, the construction and arrangement being such that the forward end of the strip, during this feeding movement, assumes a position above and in alinement with the face 114 of the die at the cutting and bending station 52. If desirable a spring (not shown) may be positioned on the rod 264 between the plate 276 of the carrier 46 and the nut 282 on the rod.

The air lines 88, 88*a* (Fig. 1) are connected to a line 294 which is connected to a supply of air under pressure and in which is interposed a valve 296 comprising a plunger 298 which is actuated in timed relation with the carrier 46 by a cam 300 secured to the crank shaft 94.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine for forming dowels used to reinforce wood heels, a turret comprising a plurality of dies each having a semi-cylindrical recess and a shearing edge extending lengthwise of the die, means for indexing the turret to move the dies respectively to a plurality of operating stations, means for feeding a strip of metal over the semi-cylindrical recess of each of the dies as it is moved to one of said stations, a carrier, power means for moving the carrier toward and away from the turret, means responsive to movement of the carrier away from the turret for indexing said turret, a punch secured to the carrier and having a shearing edge cooperating at said one station with the shearing edge of the die at said one station to trim from said strip a metal blank then arranged over the semi-cylindrical recess of this one die, said punch also having a former for forcing said blank at said one station into the semi-cylindrical recess of the die whereby to bend the median longitudinal portion of said blank to the shape of said recess with lateral margins of the bent blank, now U-shaped in cross section, spaced from each other and projecting out of the recess, a magazine adapted to receive cores of the dowels, a yieldable tray arranged opposite spaced lateral margins of the blank positioned in said die indexed to a second station, means for transferring at said second station one of said cores from the magazine to the tray, a tool which is secured to the carrier and is adapted to force said core on the tray into the U-shaped blank in the die at said second station, an inturning punch secured to the carrier and adapted to bend at a third station portions of the projecting margins of the blank toward each other, a closing punch secured to the carrier and adapted to force at a fourth station the lateral margins of the blank against the core whereby to form a jacketed dowel, stripper pins movable respectively into the semi-cylindrical recesses of the dies of the turret, means responsive to indexing of the turret from said fourth station for moving the stripper pins into the semi-cylindrical recesses of the dies leaving said fourth station whereby to loosen the jacketed dowel in the die from said die, and means for ejecting said loosened dowel from its associated die.

2. In a machine for applying metal jackets to wood cores to form jacketed dowels for use in the reinforcing of wood heels, a turret comprising a plurality of dies each having a semi-cylindrical recess and a shearing edge, a trimming and conforming station, a core inserting station, a blank inturning station, a blank closing station and a dowel ejecting station, means for indexing the turret about an axis to cause said dies to be moved successively to said stations, means for successively feeding a strip of metal over the dies respectively moved to the trimming and conforming station, a carrier reciprocable in a predetermined path lengthwise of the axis of rotation of the turret, means for reciprocating the carrier in said path toward and away from the turret, a trimming and conforming punch which is secured to the carrier and is arranged opposite the die indexed to the trimming and conforming station and which, during movement of the carrier toward the turret, is adapted to cooperate with the die at this station to trim from said strip a metal blank of a predetermined width overlying the die and thereafter to force the median lengthwise portion of the blank into the semi-cylindrical recess of the die whereby to form a U-shaped blank a bight portion of which is conformed to said recess of the die and lateral margins of which project in spaced relation from said recess, a magazine for receiving wood cores, a yieldable tray which is arranged opposite the spaced lateral margins of the blank in the die at the core inserting station, means for ramming one of the wood cores from the magazine into the tray, a core inserting tool secured to the carrier and adapted in response to movement of the carrier toward the turret to force the core supported by the tray into the bent blank at the core inserting station, inturning and closing punches respectively which are secured to the carrier and are arranged opposite the dies in the blank inturning and blank closing stations respectively and which are adapted to cooperate with the dies at said stations during movements of the carrier toward

the turret to inturn the lateral margins of the blank projecting beyond the recess of the die toward the core and to force said inturned margins in closed relation onto the core respectively, and means for indexing the turret in timed relation with the carrier.

3. In a machine for forming metal jacketed dowels for use in the reinforcing of wood heels, a frame, a turret which is rotatably mounted upon the frame for movement to different indexed positions about an axis and which comprises a plurality of dies each having a semi-cylindrical recess, a carrier mounted on the frame, power means for moving the carrier generally lengthwise of said axis toward and away from the turret, means operated in timed relation with the carrier for rotating the turret into different indexed positions in which the dies are successively moved to a trimming and conforming station, a core inserting station, a blank inturning station, a blank closing station and an ejecting station all of which stations are spaced circumferentially about said axis, means for feeding a strip of metal to a position opposite one of the dies indexed to the trimming and conforming station, a tray comprising longitudinal halves which are yieldingly urged toward each other and are arranged opposite the recess of the die indexed to the core inserting station, a magazine positioned adjacent to the tray, ramming means operated in timed relation with the carrier for successively transferring wood cores from the magazine to the tray, a combined trimming and conforming punch secured to the carrier and arranged opposite the semi-cylindrical recess of the die indexed to the trimming and conforming station, a core inserting tool secured to the carrier and arranged adjacent to and opposite the tray and opposite the recess of the die indexed to the core inserting station, and inturning and closing punches respectively which are secured to the carrier and which are arranged opposite the recesses of the dies indexed respectively to the inturning and the closing stations, movement of the carrier toward the turret being effective to cause the trimming and forming punch to cooperate with the die at the trimming and conforming station to remove from said strip a metal blank which overlies the recess of this die and thereafter to cause said blank to be bent to a U-shaped cross section with the lateral margins of the blank projecting from the die and spaced from each other, to cause the core inserting tool to force the wood core transferred to the tray into the U-shaped blank in the die at the core inserting station and for causing the inturning and closing punches respectively to inturn and close the lateral margins of the blanks in the dies at the inturning and closing stations respectively whereby to apply the entire blank to the core and thus provide a jacketed wood core dowel.

4. In a machine for use in the manufacture of dowels, a frame, a turret mounted for indexing movement upon said frame about an axis, dies which are secured to the turret and each of which has a semi-cylindrical recess, a carrier, power means for moving said carrier on said frame generally lengthwise of said axis, means for successively indexing said dies to a core inserting station into the recesses of which dies metal blanks have been bulged in the form of a letter U, a magazine arranged at said cone inserting station for receiving cylindrical wood cores, a tray arranged above the U-shaped blank which is in the die moved into the core inserting station, means operative in timed relation with the carrier for feeding one of the cores in the magazine into the tray, and a plunger secured to the carrier and adapted to force said core supported by the tray into a bight portion of the U-shaped blank in the die.

5. In a machine for use in the manufacture of dowels, a frame, a turret mounted upon said frame for indexing movement about an axis, dies which are secured to the turret and each of which has a semi-cylindrical recess, a carrier, power means for moving said carrier on said frame generally lengthwise of said axis toward and away from the turret, means for successively indexing said dies, into the recesses of which metal blanks respectively have been bulged in the form of a letter U, to a core inserting station, a magazine arranged at the core inserting station for receiving cylindrical wood cores, a tray which comprises a plurality of parts and is arranged above the blank which is in the die moved into the core inserting station, springs for constantly urging said parts of the tray to core retaining positions, means responsive to movement of the carrier away from the turret for indexing the turret and for feeding one of the cores in the magazine into the tray, and a plunger which has a concave work engaging face and is secured to the carrier and which is adapted to force said core against the tray causing the parts of the tray to spread against the action of said springs and thus to release said core from the tray and thereafter to force the core into a bight portion of the metal blank in the die.

6. In a machine for use in the manufacture of dowels, a frame, a turret mounted upon said frame for indexing movement about an axis, dies which are secured to the turret and each of which has a semi-cylindrical recess, a carrier, power means for moving said carrier on the frame generally lengthwise of said axis toward and away from the turret, means for successively indexing said dies, into the recesses of which metal blanks respectively have been bulged to U-shaped cross sections, to a core inserting station, a magazine arranged at the core inserting station for receiving cylindrical wood cores, a tray which is divided longitudinally into two parts and is arranged above the blank which is in the die at the core inserting station, said parts of the tray being mounted for pivotal movement about parallel axes extending generally lengthwise of the tray, spring actuated means for urging the parts of the tray into engagement with each other to cause said parts to be moved to dowel supporting positions, means operative in timed relation with the carrier for indexing the turret and for feeding one of the cores from the magazine into the tray, and a plunger which has a concave work-engaging face and is secured to the carrier and which is adapted to force said core against the tray causing said parts thereof to move against the action of said spring actuated means away from their dowel supporting positions whereby to release said core from said tray and thereafter to force said core into said blank.

7. In a machine for use in the manufacture of dowels, a frame, a turret which is rotatable upon the frame about an axis and which comprises a plurality of circumferentially spaced dies each comprising a semi-cylindrical recess, a carrier slidingly mounted upon said frame for translatory movement toward and away from the turret in a predetermined path extending lengthwise of said axes, a plurality of circumferentially spaced tools which are secured to the carrier and are adapted to cooperate respectively with the dies during movement of the carrier toward the turret whereby progressively to form dowels having metal jackets, power means for moving the carrier in said path, mechanism responsive to movement of the carrier away from the turret for indexing the turret, stripper pins carried by each of the dies and movable into and out of the semi-cylindrical recesses respectively of the dies, means responsive to indexing of the turret for moving the stripper pins into said recesses whereby to force the dowels partially out of said recesses, a chute mounted on the frame and having a side wall which is underridden successively by the dies as they are indexed and which may be engaged by the dowels partially removed from the recesses, a pair of air jets one of which extends through said side wall and acts against a side of the partially extracted dowel and the other of which acts against an end of the dowel and cooperates with the other jet to eject the dowel from the die and into the chute, and means operative in timed

relation with the turret for controlling operation of the air jets.

8. In a machine for use in the manufacture of dowels, a frame, a turret, means for indexing the turret on said frame, a plurality of circumferentially spaced dies secured to the turret, each of said dies having a face in which is formed an elongated semi-cylindrical recess extending longitudinally of the die and one lateral margin of which is beveled and the other lateral margin of which is beveled at its opposite end portions and has a shearing edge extending between the bevels, a carrier slidingly mounted on the frame, a plurality of tools secured to the carrier, means for moving the carrier on said frame toward and away from the turret to cause said tools as they are moved toward the dies by the carrier to cooperate with the dies respectively to form a blank from a metal strip and to apply to said blank a wood core whereby to form a metal jacketed wood core dowel, means for successively feeding the metal strip over the dies being indexed to one position, one of said tools which cooperates with the die at said one station having beveled faces adapted to cooperate with the lateral beveled margins of the die at said one station in order accurately to aline the turret circumferentially with the carrier and accordingly to aline said one tool with its associated die, said one tool also comprising a shearing edge which cooperates with the shearing edge of the associated die at said one station to trim from the strip of metal a blank which overlies said face of the die, and a bulger which is adapted to cooperate with the semi-cylindrical recess of the die to bend the blank to a U-shaped cross section.

9. In a machine for use in the manufacture of dowels, a frame, a turret, means for indexing the turret on said frame, a plurality of dies secured to the turret in spaced circumferential relation, each of said dies having a work-supporting face in which is formed a longitudinally extending semi-cylindrical recess and one lateral margin of which is beveled and another lateral margin of which is beveled at its opposite end portions and has a shearing edge extending between the bevels, a carrier slidingly mounted on the frame, a plurality of tools secured to the carrier, means for moving the carrier on said frame toward and away from the turret to cause said tools as they are moved toward the turret by the carrier to cooperate with the dies respectively to form a blank from a metal strip and to apply to said blank a wood core whereby to form a steel jacketed wood core dowel, and means for successively feeding the metal strip over the dies indexed to one station, one of said tools which is adapted to cooperate successively with the dies at said one station having bevel faces cooperating with the lateral beveled margins of the die at said one station in order accurately to aline the turret circumferentially with the carrier and accordingly to aline said tools with the associated dies, said one tool also comprising a shearing edge which cooperates with the shearing edge of the associated die at said one station to trim from said metal strip said blank which overlies said face of the die in which the recess is formed, and a bulger which has a blank-engaging face and is adapted to cooperate with the semi-cylindrical recess of the die to bend the blank to a U-shaped cross section, a pair of spring-pressed pins which are carried by the bulger and project beyond said blank-engaging face of the bulger and which are constantly urged to projected positions beyond the blank engaging face and are adapted, during movement of the carrier toward the turret, to hold the metal strip against displacement on the work-supporting face of the die while the blank is being formed by the shearing edges of said one tool and the die and while the bulger is approaching said blank.

10. In a machine for use in the manufacture of dowels, a die having a shearing edge and a recess comprising a bight portion which is semicircular in cross section and an entrance portion having opposite parallel side faces, means for positioning a strip of metal over the die, a punch comprising a shearing edge and a semi-cylindrical bulger having a work-engaging face which is smaller than but is generally complemental to said recess, a pair of retaining pins which are carried by and are slidable in the bulger and are movable to projected positions beyond the work-engaging face of the bulger, and springs for constantly urging the retaining pins to projected positions beyond said face of the bulger, and means for moving the punch relatively to the die to cause the pins to force said strip of metal against the die and the shearing edge of the bulger to cooperate with the shearing edge of the die to trim a blank from said strip and thereafter to cause the bulger to force a lengthwise median portion of the blank into the recess to bend said blank to a U-shaped cross section.

11. In a machine for use in the manufacture of wood core metal jacketed dowels, a die having a semi-cylindrical recess arranged to contain a U-shaped metal blank a lengthwise median portion of which has been bent generally to the shape of the recess and the lateral margins of which project from said recess, a magazine arranged at one end of the die and adapted to receive cylindrical wood cores of said dowels, a tray which is arranged adjacent to and above the U-shaped metal blank and which comprises opposite longitudinal parts mounted for movement toward and away from one another, spring actuated means for constantly urging said parts of the tray toward each other for normally maintaining said parts in core supporting positions, a rammer movable through the magazine for successively transferring the cores from the magazine to the tray, an inserting tool which has a trough-shaped engaging face and is movable between and past said parts of the tray and toward and away from the die, and means for moving the tool toward the die to force one of said cores in the tray against said parts of the tray and to move said parts away from one another against the action of said spring actuated means and thereafter to force the core into the U-shaped metal blank in the recess of the die, and means operative in timed relation with the tool for operating the rammer.

12. In a machine for forming dowels for use in the reinforcing of wood heels, a frame, a turret, a plurality of dies which are secured to the turret in circumferentially spaced relation, each of said dies having a semi-cylindrical recess, means for indexing the turret on said frame to move said dies successively to a plurality of operating stations, means for positioning flat metal blanks over the semi-cylindrical recesses of the dies moved successively to one of said operating stations, means for successively bending the flat metal blanks into the recesses of said dies at said one operating station whereby to form in said recesses U-shaped blanks lateral margins of which project out of the recesses, means cooperating with the dies indexed to a second operating station for automatically inserting wood cores into the U-shaped blanks in the dies, and a punch which is positioned at a third operating station and is provided with a work-engaging face having inwardly converging sides forming a recess between them, said punch having slidingly mounted in it a yieldable presser bar which extends into said recess and is adapted to force the core in the U-shaped blank housed in the die firmly against a bight portion of said blank as said inwardly converging sides of the punch operate on the propecting lateral margins of the blank to inturn them toward each other and toward the core.

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