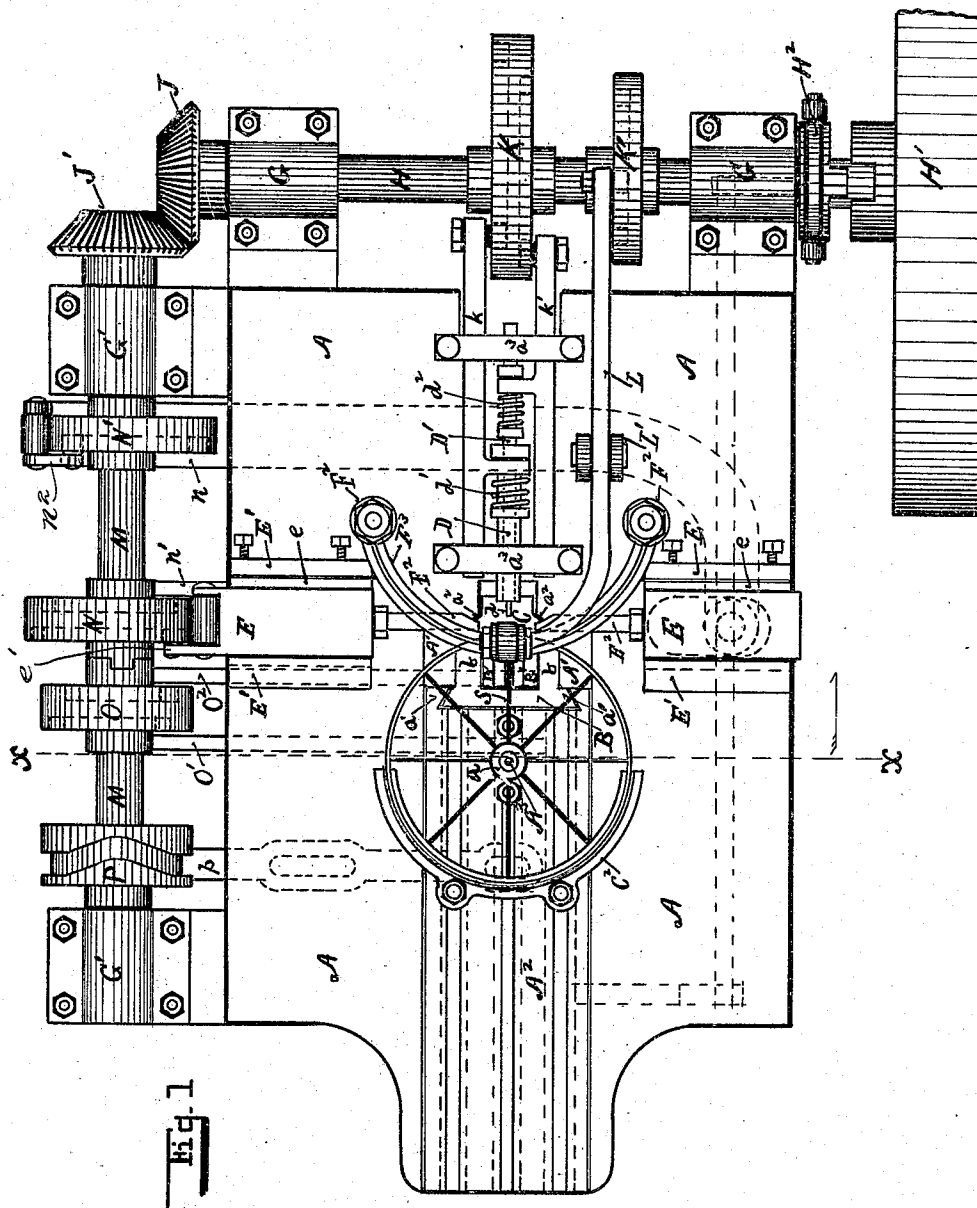


J. W. PEPLINSKI & C. F. THAYER.
 AUTOMATIC SPOKE INSERTING MACHINE.
 APPLICATION FILED JULY 25, 1908.

930,986.

Patented Aug. 10, 1909.
 4 SHEETS—SHEET 1.



Witnesses.

Florence Stockert.
G. J. Mead

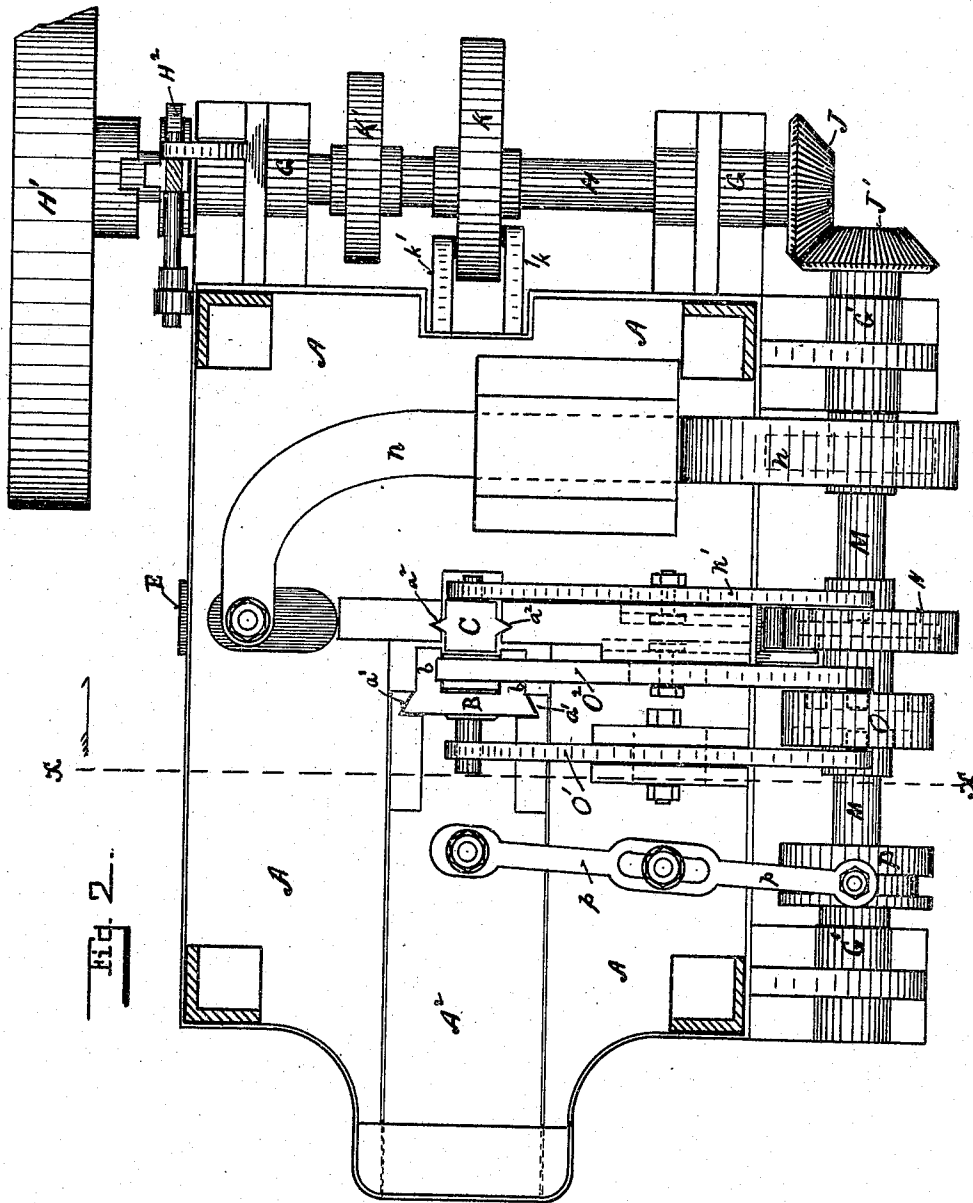
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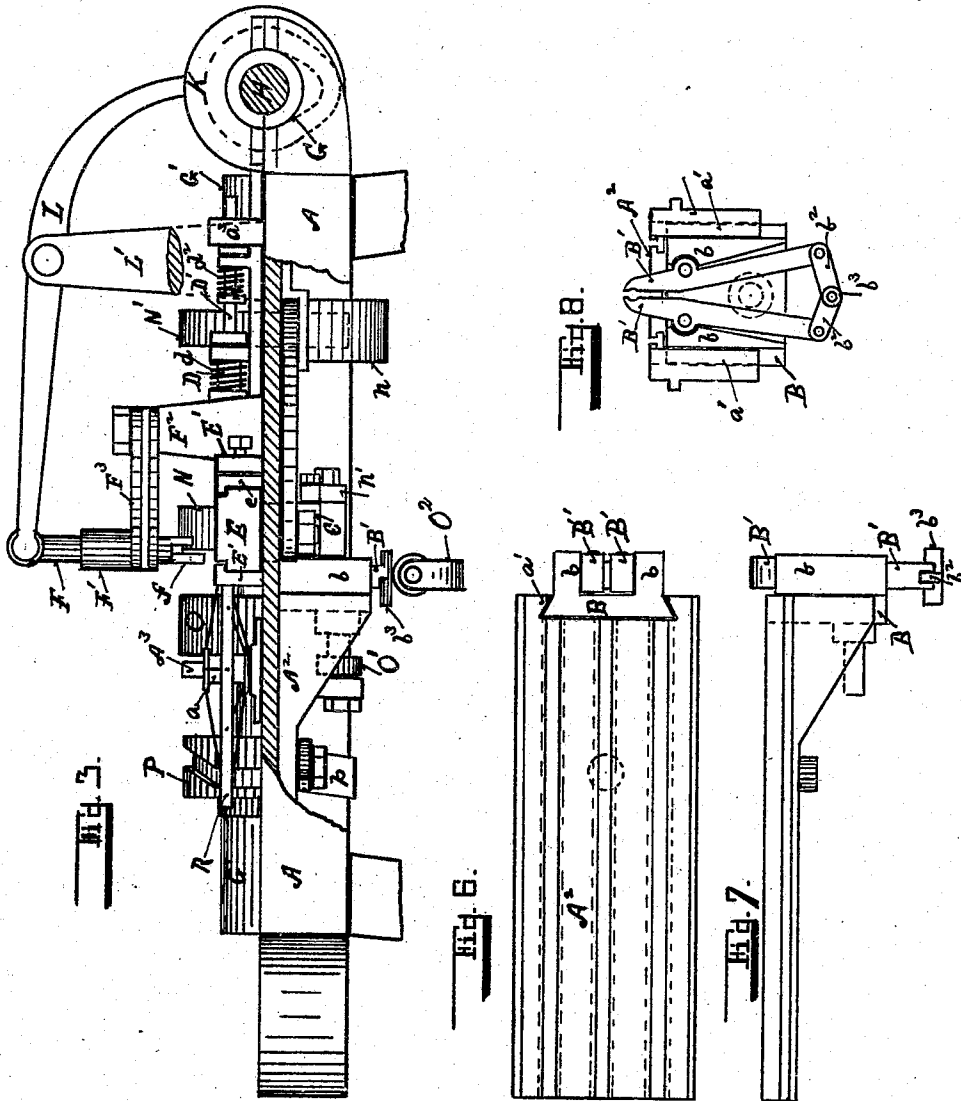
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Witnesses

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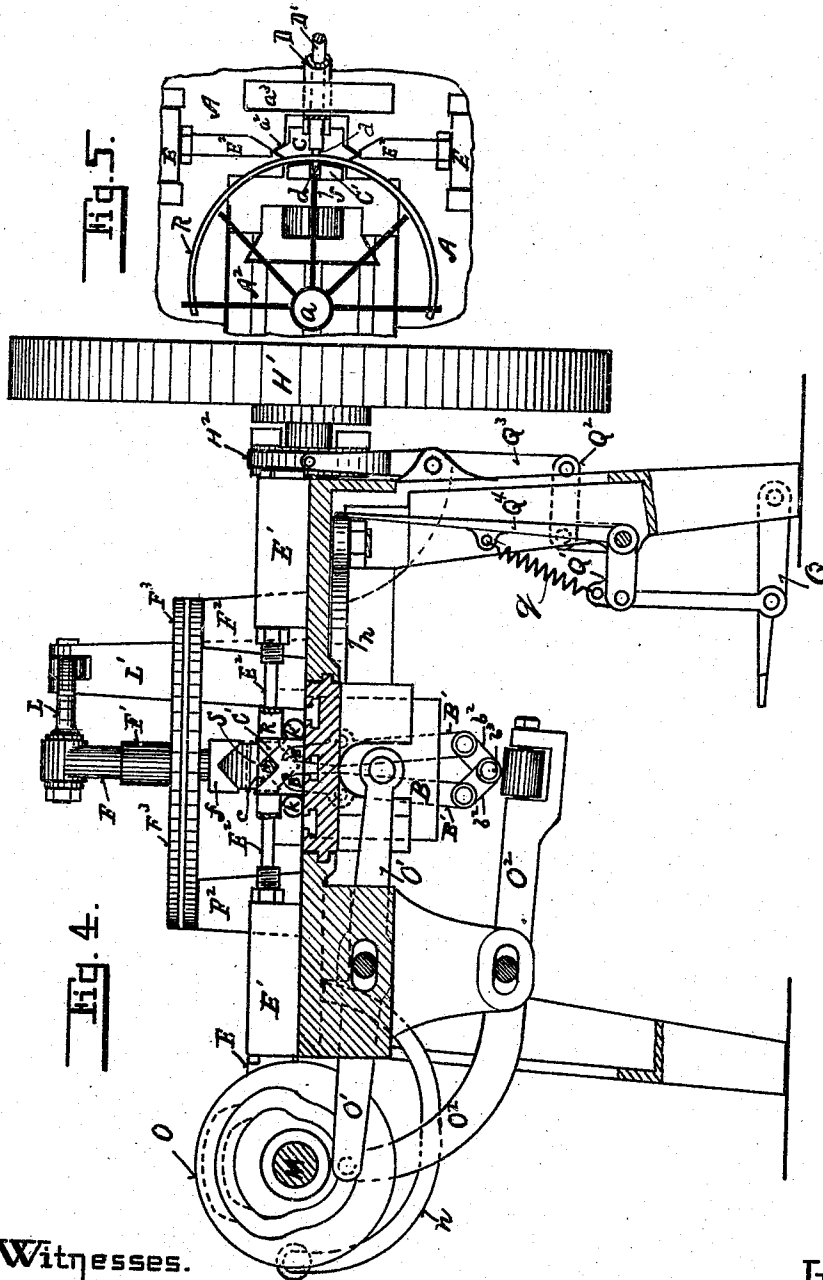
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Witnesses.

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UNITED STATES PATENT OFFICE.

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H. N. THAYER COMPANY, OF ERIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AUTOMATIC SPOKE-INSERTING MACHINE.

No. 930,986.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed July 25, 1908. Serial No. 445,423.

To all whom it may concern:

Be it known that we, JULIUS W. PEPLINSKI and CLARK F. THAYER, citizens of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have jointly invented certain new and useful Improvements in Automatic Spoke-Inserting Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

Our invention relates to automatic spoke inserting machines, for use in constructing children's velocipede, and wagon wheels and baby carriage and go-cart wheels, and has for its object the construction of mechanism adapted to center the spoke-hole through the rim at a given point, draw the spoke backward and position the outer end thereof in concentric alinement with the spoke-hole in the rim, move the spoke forward so as to insert the outer end thereof through the proper hole in the wheel rim, and finally to pinch or flatten the end of the spoke so that it cannot be withdrawn from the hole in the wheel-rim while the rest of the spokes are being inserted into their respective holes in the wheel-rim.

In carrying out our invention we have devised a form of mechanism embodying our ideas the features of which are hereinafter more fully pointed out and explained, and which are illustrated in the accompanying drawings in which:

Figure 1 is a plan view of a machine embodying our invention. Fig. 2 is a like view of the under side of the same, the legs thereof being broken off. Fig. 3 is an edgewise view of the same from the drive-wheel side thereof, with portions of the frame broken away and drive-wheel removed. Fig. 4 is a transverse section of the same on the line $x-x$ in Figs. 1 and 2, looking in the direction of the arrow. Fig. 5 is a plan view of a fragment of the frame of the machine with a portion of the overhanging mechanism removed, so as to show the operation of the hole-positioning mechanism. Fig. 6 is a plan view of the wheel holding slide showing the manner of mounting the spoke-clamping jaws there-

on. Fig. 7 is an edgewise view of the same. Fig. 8 is an endwise view of the same.

In these drawings A is the frame-plate of the machine, which is provided with a slide-opening A' in which we mount a slide A², upon which slide we secure a wheel-spindle A³ upon which the hub a of a wheel with its projecting spokes may be placed. Upon the front end of the slide A² we mount in suitable ways $a' a'$, a vertical slide B, which slide is provided with vertical shoulders or ribs $b b$ on its face, between which we mount spoke-clamping jaws B' B' by means of suitable pivots, the lower ends of said jaws B' being provided with a toggle $b^2 b^2$ of ordinary construction.

In front of the vertical slide B within vertical ways a^2 in the frame A, (see Figs. 1, 2 and 5) we mount a vertically slidable block or rim support C, which is provided with an upward projection C' on its upper end, in the top of which projection or shoulder C' we make a V-shaped cut c for the purpose hereinafter set forth. This support C supports the front edge of the wheel-rim, and for the purpose of supporting the rear edge thereof we have provided a semi-circular rim support C² (see Fig. 1) which we secure upon the slide A².

Upon the top of the frame A in line with the slide A² in suitable ways or guides a^3 , we mount a hollow cylindrical slide D, and within the cylindrical slide D, we place another slide D', the slide D' being adapted to slide forward so that the tip d on the front end thereof will extend through a spoke-hole in a wheel-rim when the same is placed in position on the support C, as shown in Fig. 5, and the slide D being adapted to then slide forward and clamp the wheel-rim against the projection or shoulder C' of the support C, when the tip d on the slide D' may be drawn backward from the wheel-rim. In order to operate these slides D and D' with yielding pressures, we provide them with the spiral springs d' and d^2 against which springs the operative power is exerted. The sides of the slide D are slotted at the front end as shown in Fig. 5, to permit the swages E² E², hereinafter described, to enter and press against the end of the spoke when it extends through the wheel-rim and into the cylindrical cavity in the front end of the slide D.

Upon the top of the frame A at each side of

the rim support C, we place horizontally slidable blocks E E, which are mounted in suitable ways E'. These blocks E are provided at their inner ends with spoke pinching or flattening swages E² E², adapted when they are moved forward, to meet against opposite sides of a spoke when thrust through a hole in a wheel-rim placed upon the support C. The ways E' are provided with an adjustable take-up *e* adapted to take up any wear that may occur from the operation of the machine.

In order to force the spoke downward into position in the apex of the V-shaped cut *c* in the top of the projection C', we provide a vertically movable plunger F which is mounted in a suitable guide F' supported above the frame A by any suitable means but preferably by means of the posts F² F² and yoke F³, as shown. The lower end of the slide F is provided with a block *f*, having an inverted V-shaped cut in the bottom thereof, said block *f* being so positioned that when it is moved downward the block *f* just passes the projection C' on the support C, when said rim-support C is in its upward position.

For operating the hereinbefore described mechanism we have provided bearings G G at one end of the frame A, and G' G' at one side thereof. In the bearings G we mount a shaft H upon one end of which we secure a suitable drive-wheel H' and clutch mechanism H², by means of which clutch mechanism the power may be thrown on or off of the machine as desired. Upon the opposite end of the shaft H we secure a miter-gear J. We also place upon said shaft H two cam-wheels K and K'. The cam-wheel K having cam-grooves in the sides thereof, which are adapted, through the intermediate slides *k* and *k'* mounted in the guides *a*², to cause the slides D and D' to operate as hereinafter described. The cam-wheel K' having a cam-groove in one side thereof, adapted through the oscillating lever L pivoted in the top of the post L' to cause the slide F to operate as hereinafter described.

Within the bearings G' we mount a shaft M, having secured upon one end thereof a miter-gear J' which intermeshes with the gear J, and thereby causes the shaft M to rotate in unison with the shaft H. Upon the shaft M we secure cam-wheels N and N'; the cam-wheel N being adapted to operate the block E adjacent to it, and the cam-wheel N' being adapted, through the slide *n* extending from said cam-wheel underneath the frame A to and connected with the block E on the opposite side of the frame A, to operate said opposite block E, said blocks E and their attached swages E², by means of said cams N and N' being caused to approach each other and to recede from each other as and for the purpose hereinafter described. The cam wheels N and N' are provided with cam

grooves in their sides, as shown by broken lines in Fig. 1, in which studs on the small arms *e'* and *n*², on one of the blocks E and slide *n*, operate to cause the swages E² to return to their open position as shown in Fig. 1. The cam-wheel N being also provided with a cam-groove in one side thereof, adapted, through the lever *n'* to cause the vertically slidable support C to move upward and downward, as hereinafter described.

For the purpose of operating the spoke-clamping jaws B' B' to move upward and clamp a spoke, we place upon the shaft M a cam-wheel O, having in one side thereof a cam-groove adapted, through the lever O' to cause the vertical-slide B carrying said jaws B' B' to move upward sufficiently to allow said jaws to embrace the sides of a spoke, said cam-wheel O also having in the other side thereof another cam-groove adapted through the lever O² to cause said jaws to securely clamp a spoke thereinbetween when they have been moved upward the required distance, as hereinafter described. And for operating the slide A² we provide upon the shaft M a cam-wheel P adapted through the lever *p*, to cause said slide A² to reciprocate as hereinafter described.

The fulcrums of the levers, *n*, O² O' and *p*, are all made adjustable, as illustrated in Figs. 2 and 4, so that the distance of movement of the parts operated thereby can be properly adjusted.

For operating the clutch mechanism H², we provide a foot-lever Q, and bell-crank and lever mechanism Q', Q², Q³ and Q⁴, and a spring *q* adapted to return the clutch to an open position when pressure is removed from the foot-lever Q. The lever Q⁴ is adapted to be operated by the end of the slide *n*, to engage the clutch when the blocks E E are moved backward, so that the mechanism hereinbefore described will come to a full stop after the inserting of each spoke. When the operator presses down the foot lever Q to start the machine, the lever Q⁴, being loosely mounted on the rock-shaft, and being held back by the slide *n* does not move, but the spring *q* between the levers Q' and Q⁴ permits the lever Q' and rock-shaft to rotate and operate the clutch lever Q³ which is rigidly secured upon the rock-shaft, to close the clutch and start the machine.

In operation the operator will place a wheel rim R on the supports C and C² so that the tip *d* upon the end of the slide D' extends through a spoke-hole therein, and the upward extension C' is between the hub-spindle and the wheel-rim R. The hub *a* of the wheel with its projecting spokes is then placed upon the hub-spindle A³ and carefully pressed down thereupon. A spoke S is then placed over the V-shaped cut in the upward extension C'. The foot-lever Q is then pressed downward which will cause the clutch

H² to become engaged and cause the shafts H and M, and their cam-wheels to revolve, which revolution of shafts and cam-wheels causes the several parts to operate in the following sequence: The support C will move upward to the position shown in Fig. 4, with the extension C' thereon back of the wheel-rim R. The slide D will then move forward pressing the wheel-rim previously centered upon the tip *d* of the slide D' against the extension C' the tip *d* of the slide D' moving forward through the spoke-hole in the rim. The slide A² will then draw backward far enough to permit the outer end of the spoke S to clear the inside of the wheel-rim R upon the support C, as shown in Fig. 5. The slide F is then operated to move the end of the spoke S to a point in line with the end of the tip *d*. The clamp-jaws B' B' will then move upward and securely grip the spoke S therebetween. The slide A² carrying the wheel-hub *a* and clamp-jaws B', will then move forward, the slide D' and tip *d* recede, and the spoke S be inserted into the spoke-hole vacated by the tip *d*. The swages E² then move forward against the sides of the end of the spoke S in opposition to each other with sufficient pressure to flatten the end of the spoke S, so that it cannot be withdrawn from the hole while the rest of the spokes are being inserted into their respective holes in the wheel-rim. The support C will then drop down sufficiently to permit another spoke S to be moved into place, and the tip *d* will move partially forward again, when the clutch H² is disengaged by the action of the lever *n* upon the lever Q⁴, and the mechanism comes to rest, ready for the operation to be repeated, on each spoke until all the spokes in the wheel have been inserted or laced into the rim and ready for the riveter. One object of the machine being to loosely secure each spoke in its place in the rim, until all the spokes are laced, as otherwise it would not be possible to get them all put in place.

Having thus described the construction and operation of our invention, what we claim as new and desire to secure by Letters Patent is:

1. The combination in a spoke inserting machine of a centering point to position a spoke-hole in a wheel-rim, a rim support, a clamp member to clamp the wheel-rim against the rim-support, jaws to bring the free end of a spoke into alinement with said spoke-hole, and slide mechanism adapted to move the wheel-hub forward and insert the spoke into said spoke-hole in a wheel-rim, substantially as set forth.
2. The combination in a spoke inserting machine, of a centering point to position a spoke-hole in a wheel-rim, a rim-support, a clamp member to clamp the wheel-rim against said support, jaws to move the free end of a spoke into alinement with said

spoke-hole, a hub-spindle adapted to support the wheel-hub and move backward before the free end of the spoke is brought into alinement and afterward move forward to insert said spoke into said hole, substantially as set forth.

3. The combination in a spoke inserting machine, of a centering point to position a spoke-hole in a wheel-rim, a wheel-rim support, a clamp member adapted to clamp a wheel-rim against said support, a vertically operating jaw adapted, in conjunction with the rim support, to move the free end of said spoke into alinement with said spoke-hole, a horizontally movable slide, a hub-spindle mounted on said slide, and cam mechanism adapted to cause said slide to move backward before the free end of the spoke is alined and forward to insert said spoke into the spoke hole in the wheel rim after the free end of the spoke has been alined, substantially as set forth.

4. The combination in a spoke inserting machine, of a centering point adapted to position a spoke-hole in a wheel-rim, cam mechanism adapted to cause said point to move forward to receive a hole in a wheel-rim and afterward to move backward to permit a spoke end to follow it into said hole, a wheel-rim support, a vertical shoulder on said support having a V-shaped notch in the upper edge thereof, a clamping member, cam mechanism to operate the same to clamp a wheel-rim against said vertical shoulder, a vertically operating jaw having an inverted V-shaped notch in its under edge adapted to move downward past said vertical shoulder on the rim support to move the free end of a spoke into alinement with said centering point and spoke-hole, a horizontal slide, a hub-spindle mounted thereon, cam mechanism adapted to cause said slide and hub-spindle to move backward before the free end of the spoke is alined and then forward to insert the free end of the spoke into the spoke-hole, clamping members adapted to clamp the free end of the spoke before it is inserted into the hole, and cam mechanism to operate said clamping members, substantially as set forth.

5. The combination in a spoke inserting machine, of a reciprocating slide, a centering point on one end thereof to enter a spoke-hole in a wheel-rim, cam mechanism to cause said slide to move forward, a vertically reciprocating wheel-rim support, cam mechanism to alternately cause said support to raise and lower, a vertical shoulder on the upper end of said support having a V-shaped notch therein adapted to be moved upward behind a wheel-rim so that the apex of the V-shaped notch is in alinement with the lower edge of said centering point, a horizontal slide adapted to support a wheel-hub, cam and lever mechanism to cause said slide to reciprocate, vertically reciprocating spoke clamping jaws

mounted on said slide, cam and lever mechanism to cause said jaws to move upward, and cam and lever mechanism to cause said jaws to close together, substantially as set forth.

6. The combination in a spoke inserting machine, of a reciprocating slide, a centering point on one end of said slide adapted to enter and position a spoke-hole in a wheel-rim, cam mechanism to cause said slide to move forward to enter the centering point into a spoke-hole and backward to withdraw said point from the spoke-hole to permit a spoke to enter same, a vertically reciprocating wheel-rim support, cam mechanism to operate the same, a vertical extension on the upper end of said support having a V-shaped notch in the upper edge thereof adapted to be extended upward behind a wheel-rim so that the apex of said V-shaped notch is in alinement with the lower side of said centering point, a horizontally moving clamp member operating against said extension, a horizontal slide, a wheel-hub spindle secured upon said slide, cam and lever mechanism to cause said slide to move backward before the free end of the spoke is moved into alinement with the spoke-hole, and afterward to move forward to insert same into said hole, a vertical slide mounted on said horizontal slide, cam and lever mechanism to cause said vertical slide to reciprocate, jaw mechanism mounted on said vertical slide, cam and lever mechanism to cause said jaws to close together when said vertical slide has reached its limit of upward travel, and to open apart before it starts on its downward travel, and a vertical plunger to move the free end of a spoke down into the apex of a V-shaped notch in the vertical extension on the rim-support, substantially as set forth.

7. The combination in a spoke-inserting machine, of a horizontal slide, a centering point on one end thereof to enter a spoke-hole, a vertically reciprocating wheel-rim support, a vertical extension on the upper end thereof having a V-shaped notch in the upper edge thereof, a horizontally movable clamp member to be moved forward against said vertical shoulder, a horizontally movable wheel-hub support, a hub-spindle secured thereon, a vertical plunger adapted to move downward to a point adjacent to said vertical extension and move the free end of a spoke into the apex of said V-shaped notch, a vertical slide mounted on said wheel-hub support, clamping jaws mounted thereon, cam and lever mechanism adapted to cause said vertically movable wheel-rim support to

move upward until the apex of the V-shaped notch is in alinement with the centering point, and afterward to move it downward, cam mechanism to cause said longitudinal slide to press forward against said vertical extension on said wheel-rim support, cam and lever mechanism adapted to cause said wheel-hub support to move backward before the vertical plunger moves downward and forward when it is in its upward position, cam and lever mechanism to raise the vertical slide on the wheel-hub support so that the clamping jaws mounted thereon will embrace an alined spoke, cam and lever mechanism to cause said jaws to close together when they have been raised to their highest point of vertical movement and to open before they start on their downward movement, and cam and lever mechanism to operate said vertical plunger, substantially as set forth.

8. The combination in a spoke inserting machine, of a centering point to position a spoke-hole in a wheel-rim, a rim-support, a clamp member operating against said rim support, jaws to move the free end of a spoke into alinement with said spoke-hole, slide mechanism adapted to move the wheel-hub forward and insert the spoke into said spoke hole in the wheel-rim, and swages operating to flatten the free end of said spoke after it has passed through said spoke-hole to prevent said spoke-end from being withdrawn from said hole during the insertion of the remaining spokes into the wheel-rim, substantially as set forth.

9. The combination in a spoke inserting machine, of a centering point adapted to position a spoke-hole in a wheel-rim, a rim support, a clamp-member to operate against said rim support, jaws to move the free end of a spoke into alinement with a spoke-hole, a hub-spindle to support a wheel-hub and move backward before the free end of the spoke is alined and then move forward afterward to insert the free end thereof into the spoke-hole, swaging jaws operating to flatten the end of said spoke after it has passed through said spoke-hole to prevent its withdrawal therefrom during the insertion of the remaining spokes in the wheel-rim, and cam mechanism to operate said swaging jaws, substantially as set forth.

In testimony whereof we affix our signatures, in presence of two witnesses.

JULIUS W. PEPLINSKI.
CLARK F. THAYER.

Witnesses:

GEO. A. STURGEON,
H. STURGEON.