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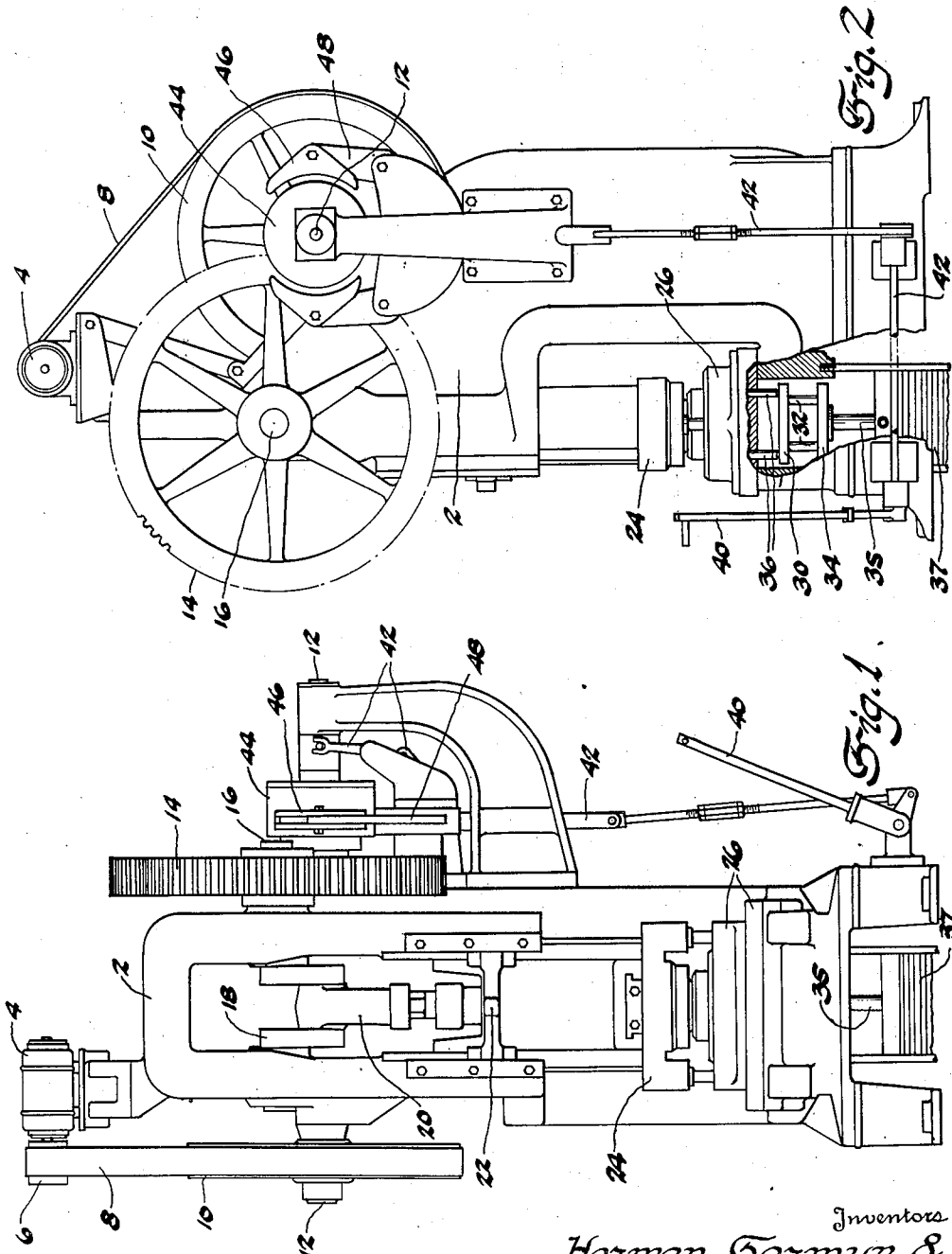
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1,995,485

MACHINE TO COUNTERSINK TWENTY HOLES IN A WHEEL HUB SHELL FOR SHORT SPOKES

Filed July 29, 1932

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

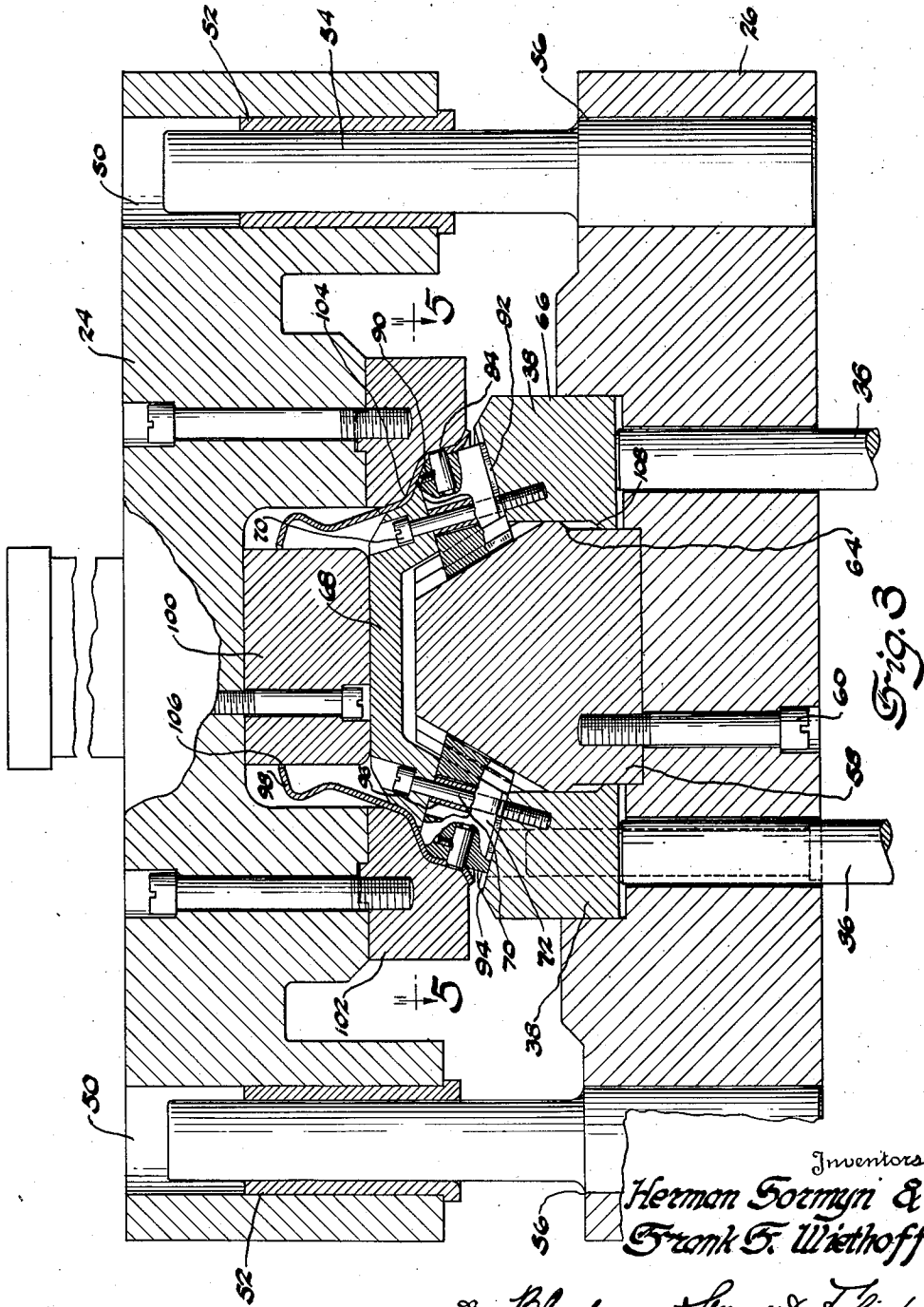


Fig. 3

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4 Sheets-Sheet 3

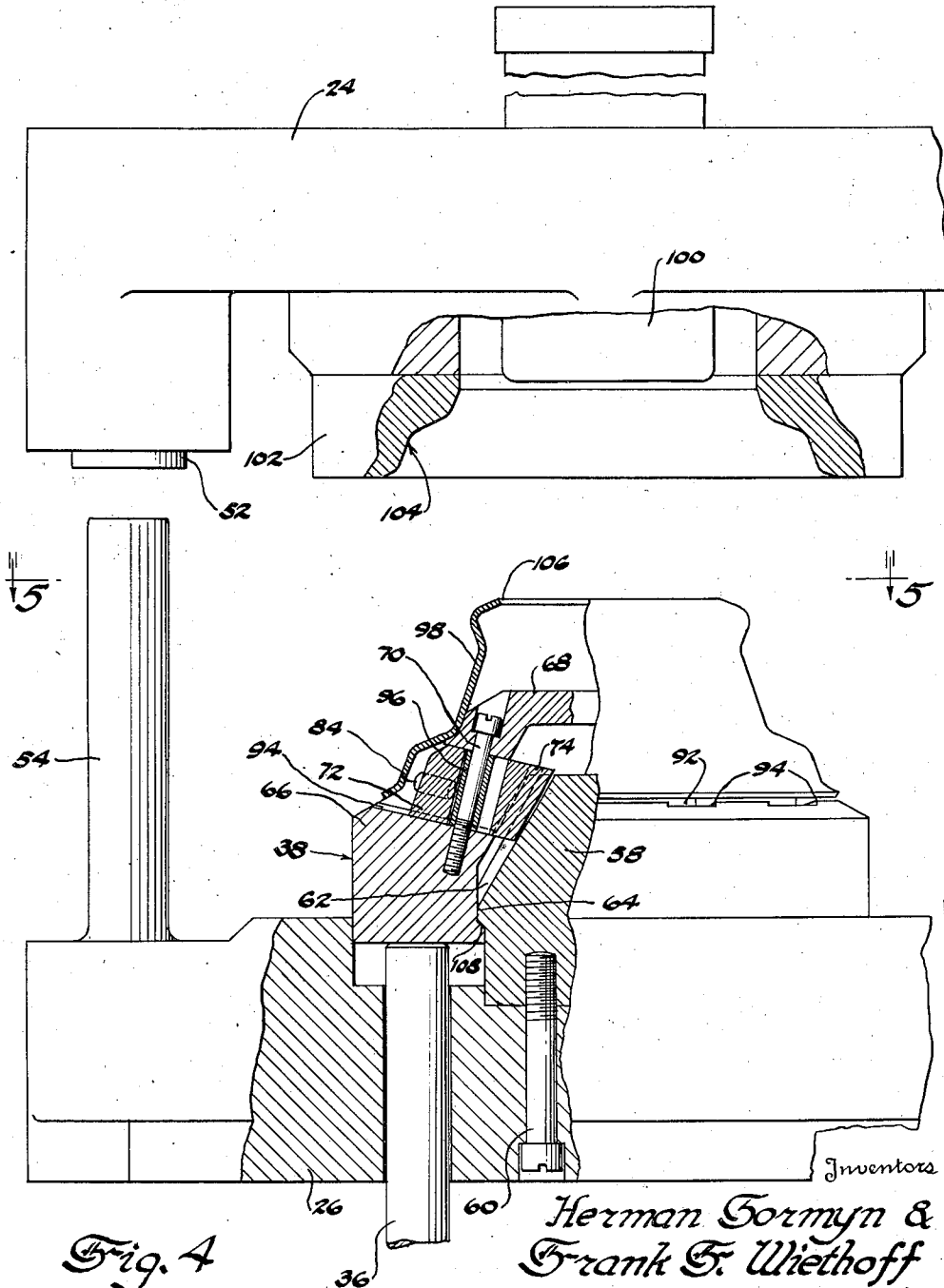


Fig. 4

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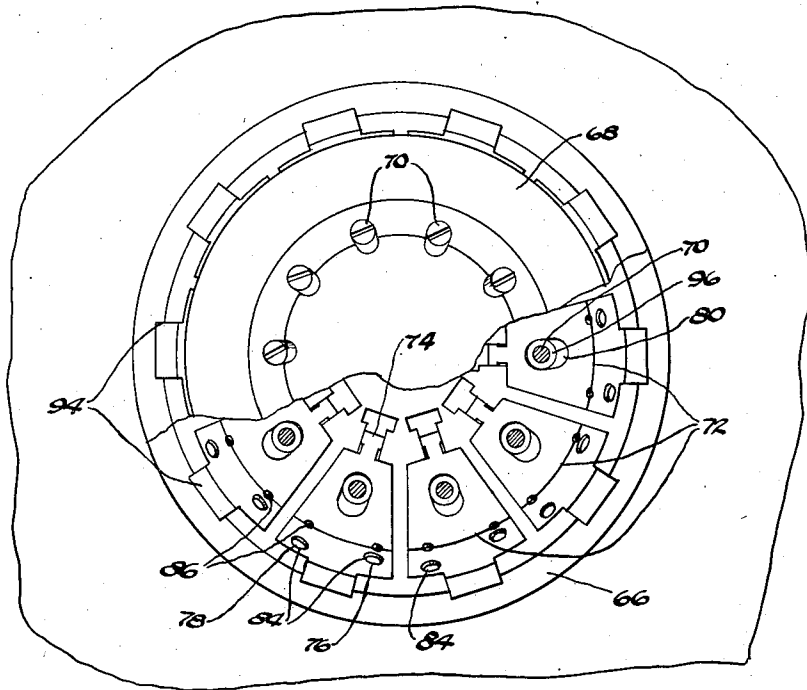


Fig. 5

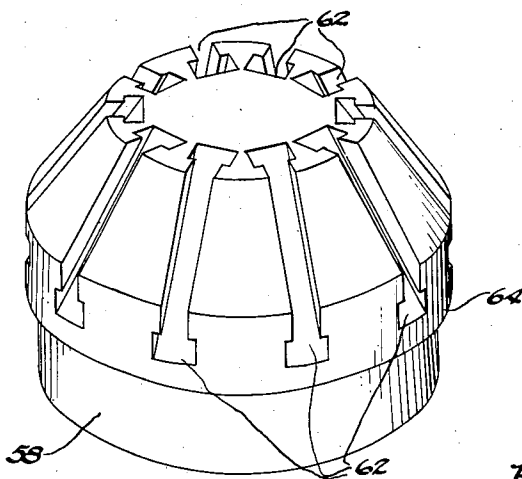


Fig. 6

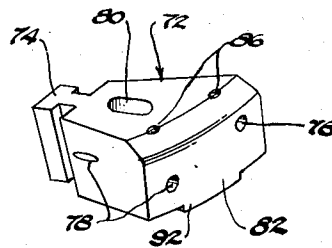


Fig. 7

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# UNITED STATES PATENT OFFICE

1,995,485

## MACHINE TO COUNTERSINK TWENTY HOLES IN A WHEEL HUB SHELL FOR SHORT SPOKES

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Application July 29, 1932, Serial No. 625,991

7 Claims. (Cl. 78—60)

This invention relates to the manufacture of wire wheels and has particular reference to a machine for the countersinking of the spoke holes in the wheel hub. The machine of the present invention is one of ten machines and follows in sequence the operation of the machine described in our copending application, Serial No. 625,990, filed July 29, 1932.

After the wheel hub has been circumferentially punched with the plurality of holes for the short spokes as set out in the copending application referred to, the wheel hub is transferred to the machine of the present invention in which the holes are countersunk on the inner portion of the hub. The machine comprises the lower die shoe and the top die or shoe. On the die shoe, there is mounted the slide guide block having a plurality of cam faces or surfaces. Over the slide guide block there is fitted that punch holder slide in which the punch holders are mounted. The punch holder slides have a face cooperating with the cams on the guide block to force the punch holders outwardly when the top shoe descends, the outward movement of the punch holders causing the punches to countersink the spoke holes.

On the drawings:

Figure 1 is a front view of the press of the invention.

Figure 2 is a side view of the structure of Figure 1.

Figure 3 is an enlarged sectional detailed view through the center of the press showing only the mechanism for countersinking the openings.

Figure 4 is a view similar to Figure 3 but showing the parts in separated relation before the top shoe has descended upon the die shoe.

Figure 5 is a plan view taken substantially on the line 5—5 of Figures 3 and 4 with parts broken away clearer to illustrate the construction.

Figure 6 is a perspective view of the guide block.

Figure 7 is a perspective view of one of the punch holders.

Referring to the drawings, the numeral 2 indicates the machine or press of the invention as a whole. The press comprises the upright frame at the upper portion of which an electric motor 4 is mounted. The motor has the driving pulley 6 which drives a belt 8 which in turn drives a flywheel 10 rigidly mounted on the axle 12 which extends across the frame of the machine and at the opposite side has a gear wheel (not shown) mounted thereon which meshes

with and drives the large gear 14 rigidly mounted on the shaft 16 having a crank 18 intermediate its ends. The crank 18 has attached thereto the connecting rod 20 which operates the crosshead 22 suitably attached to the top shoe 24 of the die. The lower die shoe is indicated at 26 and a part thereof is resiliently mounted on the ends of the pressure pins 36 resting on a lower plate 30. Suitable pins 32 connect the plate 30 with a second plate 34 secured on a piston 35 connected to a piston operating in a cylinder 37 to form an air cushion. The pins 36 abut at their lower ends against the plate 30 and at the upper ends against the bottom of the slide holder 38 (Figures 3 and 4). This structure gives a resilient mounting to the slide holder 38.

A handle 40 operating a linkage system 42 operates a suitable clutch (not shown) which causes the small gear on the end of the shaft 12 to be engaged with the shaft and to rotate the gear 14. After one operation of the punch a suitable throw-out mechanism will throw the clutch out of engagement with the gear. This mechanism is not shown but is conventional and well known in the art. A suitable brake drum is shown at 44 having brake shoes 46 operated from a suitable linkage 48.

The parts so far described are conventional and are well known in the art of presses.

Referring to Figures 3 and 4 the die of the invention comprises the top die shoe 24 and the lower die shoe 26. The top shoe is reciprocable with the crosshead 22 and has openings 50 in which there are mounted the bushings 52 slidably to guide the guide pins 54 rigidly mounted at 56 in the die shoe.

The die shoe has rigidly mounted at its center the slide guide block 58 held to the die shoe by means of the machine bolts 60. The guide block 58 is best shown in the perspective view in Figure 6 and is shown to be conical at its upper end. The conical portion has ten T-shaped grooves 62 forming cam faces or grooves. The block has the projecting shoulder 64, the purpose of which is to limit the upward movement of the punch holder slide 38.

Fitting over and surrounding the guide block 58 is the punch holder slide 38. The slide 38 comprises the lower portion 66 and the cap portion 68 secured together by means of the machine bolts 70 which pass through openings in the cap 68 and are threaded into the lower portion 66. By referring to Figures 3 and 4, it will be noted that the bolts 70 are outwardly and down-

wardly inclined so that in their final position, they will hold the cap portion 68 spaced from the lower ring portion 66.

In the space between the ring portion 66 and the cap 68 ten radially arranged punch holders 72 are slidably mounted. One of these holders is shown in detail in Figure 7 and each comprises the inner T-shaped head 74 which slidably fits in one of the slots 62 of the guide block 58. Each punch holder has the upper and lower openings 76 and 78 and the vertical slot 80. In the ends of the openings 76 and 78 at the outer face 82 of the slide the punches 84 are mounted. The openings 76 and 78 extend all the way through the block in order that the punch may be knocked out for purposes of replacement. Suitable openings 86 are positioned at right angles to the openings 76 and 78, the purpose of which is to receive screws 90 which rigidly hold the punches 84 in the slide blocks 72. A projecting portion or tongue 92 on the lower portion of the slide blocks fits into the corresponding groove 94 on the upper face of the lower ring member 66 and guides the blocks in a definite path. The bolts 70 pass through the slots 80 in the slide blocks and have the bushings 96 therearound inside the slots to take up wear and to prevent rattle and looseness of the parts.

The cap portion 68 and the outer portion of the punch holders 72 are shaped to receive the wheel hub 98 as shown in Figures 3 and 4.

The top die or shoe 50 includes the block 100 and the pressure pad or positioning ring 102. The ring 102 has a shape 104 at its interior portion to conform to the shape of the wheel hub adjacent the punch holders 72 and punch holder slide 38 as is shown in Figures 3 and 4. When the top shoe descends the shaped part 104 fits on to the wheel hub at the punch holder slides and the block 100 passes through the opening 106 in the wheel hub and strikes the top face of the cap 68.

The operation of the die is as follows: When the top shoe descends and the block 100 comes in contact with the cap 68 and the ring 102 with the wheel hub 98, it will push the holder slide 38 downwardly from the position shown in Figure 4 to that shown in Figure 3. This will cause the inwardly projecting ring 108 at the bottom of the ring member 66 of the slide holder to leave the projection 64 on the slide guide block 58 or cause a relative movement of the slide holder relative to the guide block 58. This movement will cause the T-heads 74 of the punch holders to slide or move in the T-slots 62 of the conical portion of the guide block 58 to force the punch holders 72 outwardly and cause the punches 84 to enter the spoke openings in the wheel hub and countersink the openings. The downward movement of the slide holder will force the pressure pins 36 downward which in turn will press the plate 30 downward against the tension of the air cushion and when the top shoe 24 moves upward the air cushion will force the plate 30 upward and cause the pins 36 to return the slide holder to the position shown in Figure 4.

When the parts have been returned to the position shown in Figure 4 the clutch mechanism previously mentioned will throw the power from the shaft 16 so that the operator may remove the hub 98 and place a new one in the die.

By again operating the handle 40 the new wheel hub will have its spoke openings countersunk in the manner previously described.

We claim:

1. In a machine for countersinking spoke holes in a wheel hub, as a sub-combination, a holder slide comprising a lower ring portion and an upper cap portion, said lower portion having a plurality of grooves, a plurality of slotted punch holders slidably between said ring and cap portions, said holders having tongues fitting in said grooves, bolts secured to and uniting said ring and cap portions, said bolts passing through the slots in said punch holders.

2. In a machine to countersink spoke holes in a wheel hub, a die shoe, a guide block rigidly mounted on the shoe, said block having a plurality of inclined T-shaped slots, a slide holder slidably mounted over the block and adapted to receive a wheel hub having a plurality of spoke openings, a plurality of punch holders slidably mounted on said slide holder, each punch holder having a T-shaped head operating in one of said T-shaped slots, countersinking punches in said punch holders, and means to cause the holder slide to slide over the block to cause the inclined T-slots to force the punch holders to move toward the wheel hub to countersink the spoke openings.

3. In a machine to countersink spoke holes in a wheel hub, a die shoe, a guide block rigidly mounted on said die shoe, a slide holder movably mounted on said guide block and adapted to receive a wheel hub having a plurality of spoke openings, a plurality of punch holders movably mounted in said slide holder, punches in said punch holders, said punch holders actuated by the guide block by the movement of the slide holder relative to the block, and means to cause the slide holder to move relative to the block to cause the punch holders to move toward the wheel hub to countersink the openings.

4. In a machine to countersink spoke holes in a wheel hub, a die shoe, a guide block rigidly mounted on said die shoe, a slide holder movably mounted over and around said guide block and secured thereto and adapted to receive a wheel hub having a plurality of spoke openings, a plurality of punch holders movably mounted in said slide holder, punches in said punch holders, said punch holders actuated by the guide block by the movement of the slide holder relative to the block, and means to cause the slide holder to move relative to the block to cause the punch holders to move toward the wheel hub to countersink the openings.

5. In a machine for countersinking spoke holes in a wire wheel hub, a lower die shoe, a guide block secured thereto, said guide block having a plurality of cam surfaces at the upper end thereof, a punch holder slide fitting over and movably secured to said block for reciprocable movement, said slide shaped to receive a wheel hub, a plurality of punch holders secured to and fitting in said slide for sliding movement relative thereto, the ends of said holders engaging said cam surfaces, punches in said punch holders, a reciprocable top shoe, a pad secured thereto having a surface conforming in shape to the shape of the holder slide and wheel hub, a block on the top shoe adapted to engage the holder slide, the downward movement of said top shoe causing the block and the pad to engage the holder slide and wheel hub, respectively, to push the holder slide downwardly and cause the cam surfaces to move the slides toward the wheel hub to cause the punches to countersink the openings in the hub.

6. In a machine for countersinking spoke holes

in a wire wheel hub, a lower die shoe having an upwardly projecting block portion, said block portion having a plurality of cam grooves at the upper end thereof, a punch holder slide slidably secured to said block portion, said slide adapted to receive a wheel hub, a plurality of punch holders mounted in and guided in said slide for sliding movement and having a part operating in said grooves, punches secured in said holders, a reciprocable top shoe over said die shoe having a pad to back the hub and cooperating with said slide holder to hold the wheel hub in position when the top shoe is reciprocated, the downward movement of said top shoe moving said holder slide and wheel hub downwardly and causing the cam grooves to move the punch holders in the slide holder and toward the wheel hub to cause the punches to countersink the spoke holes in the hub.

7. In a machine for countersinking spoke holes in a wire wheel hub, a lower die shoe, a top shoe over the die shoe, means to mount said top shoe for reciprocating movement relative to the die shoe, a cam portion on said die shoe having a plurality of cam surfaces, a punch holder slide secured to and slidable over said portion and adapted to receive and correctly position a wheel hub, a plurality of punch holders slidably mounted in said holder slide and having one end thereof engaging the cam surfaces, punches in the other ends of said punch holders, means to reciprocate said top shoe to cause said holder slide to slide over said portion to cause the punch holder ends to move over said cam surfaces to move the punch holders to cause the punches to countersink the spoke holes in the wheel hub.

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