Sept. 18, 1934. H. TORMYN ET AL 1,973,890

MACHINE TO FORM TWENTY BUBBLES IN A WHEEL HUB SHELL FOR LONG SPOKES

Filed July 29, 1932 4 Sheets-Sheet 1

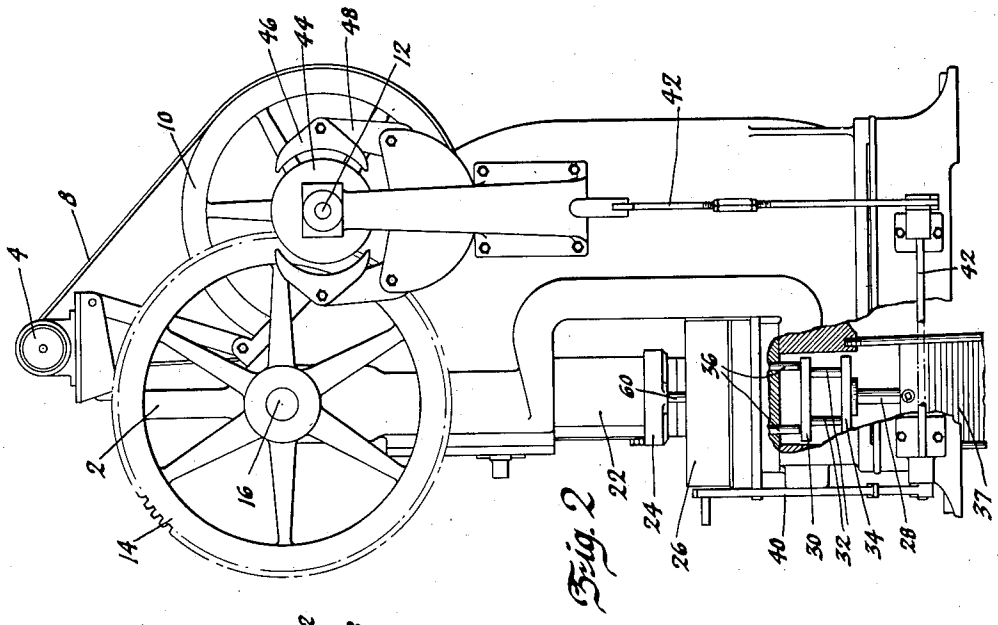


Fig. 2

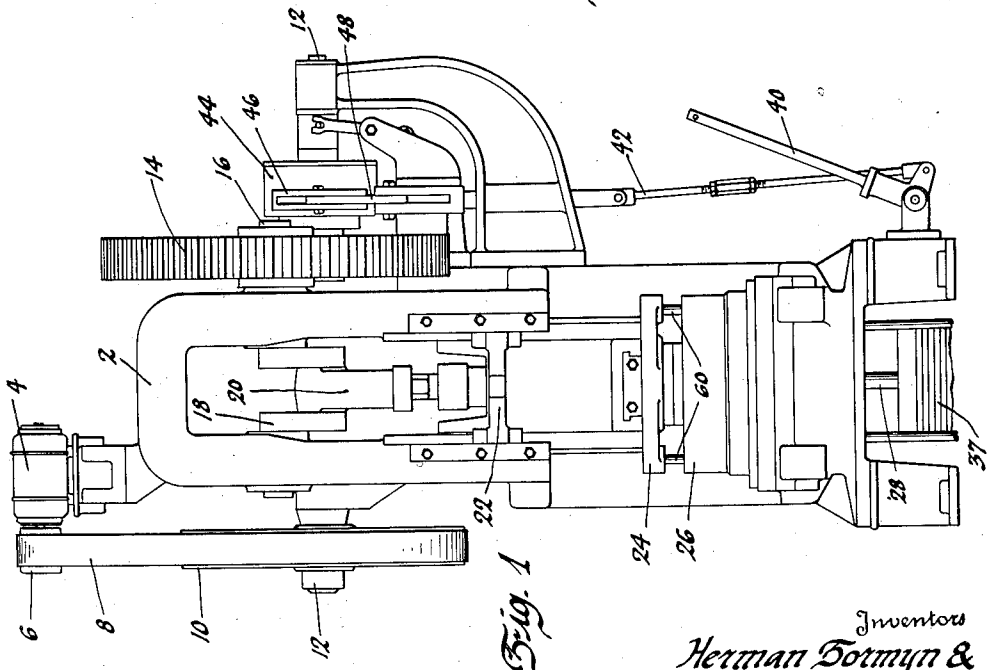


Fig. 1

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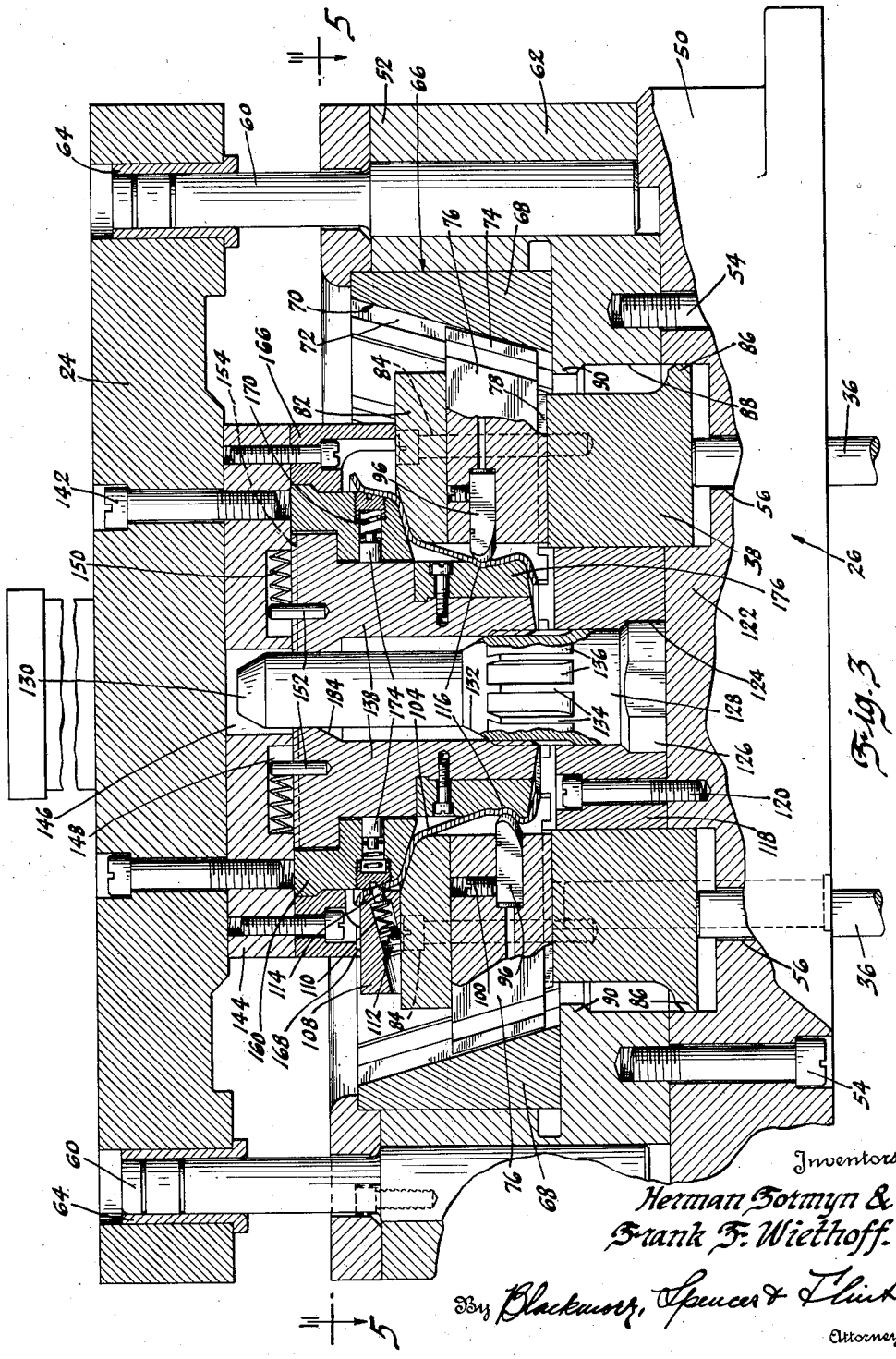


Fig. 3

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Filed July 29, 1932 4 Sheets-Sheet 3

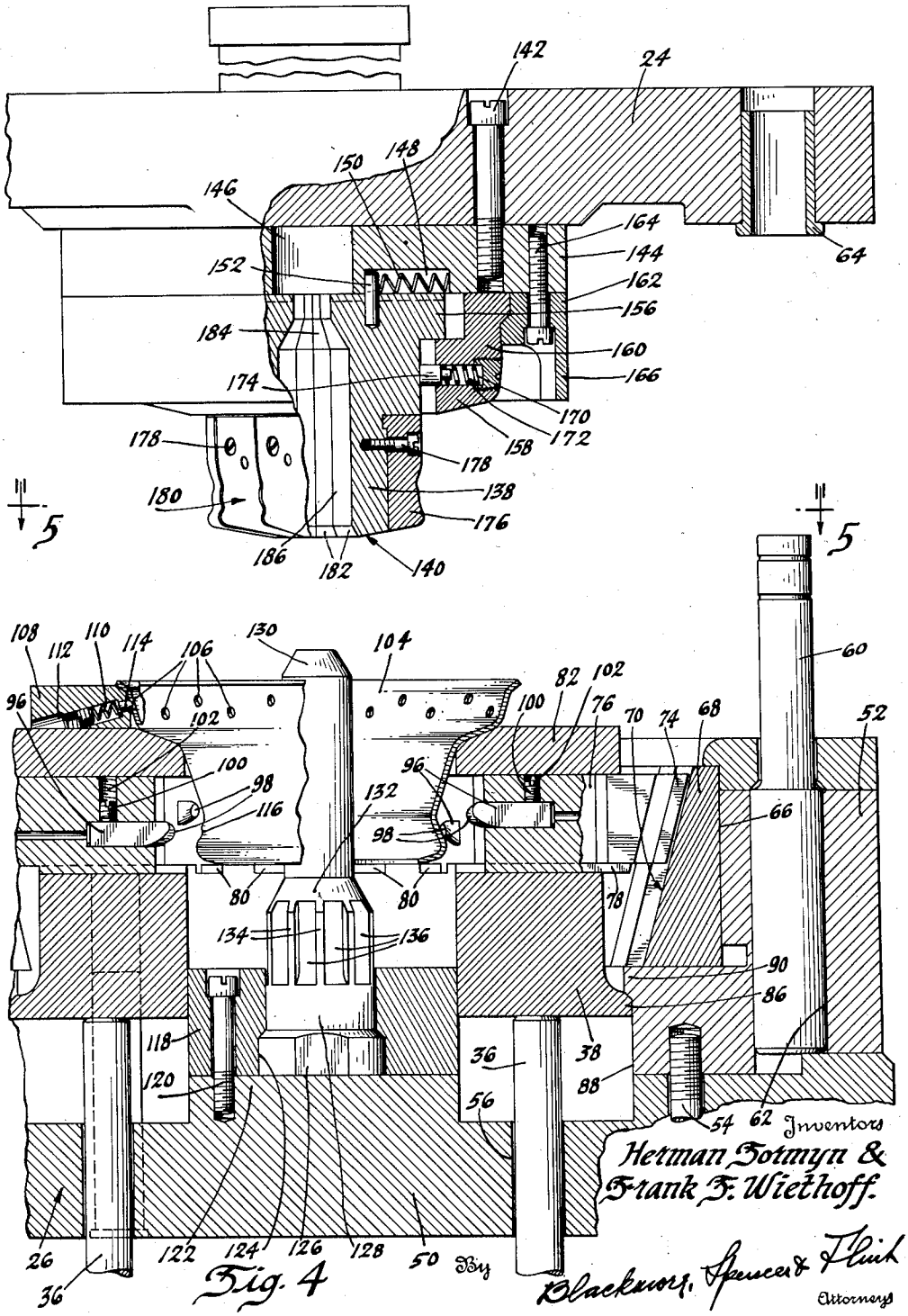


Fig. 4

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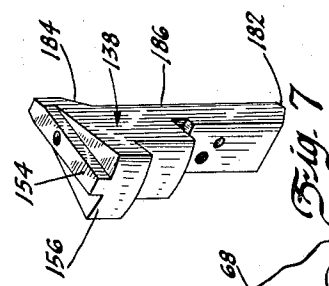


Fig. 7

Fig. 5

Fig. 6.

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UNITED STATES PATENT OFFICE

1,973,890

MACHINE TO FORM TWENTY BUBBLES IN A WHEEL HUB SHELL FOR LONG SPOKES

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Application July 29, 1932, Serial No. 625,992

4 Claims. (Cl. 153—48)

This invention relates to the manufacture of wire wheels for use in automotive vehicles and has particular reference to a machine or a die for forming twenty bubbles in the small end of the hub shell for the long spokes. The die of the present invention is one of ten dies and in sequence of operation it follows the die described and claimed in our copending application, Serial No. 625,991, filed July 29, 1932.

In securing the spokes between the hub and the rim of a wire wheel there is a definite inclination of the spoke to the radius of the wheel and a straight hole punched in the hub will not accommodate the inclination of the spoke. It is therefore necessary to depress the metal at a given angle around the spoke opening so that the metal of the hub will permit the spoke to be applied and accommodate itself to the angle of inclination of the spoke. The machine of the invention does not punch an opening in the spoke hub but indents the metal only, or makes bubbles therein. The spoke openings are later punched into a hub at the indentations by the machine described and claimed in copending application, Serial No. 625,993, filed July 29, 1932.

The die of the invention comprises a top shoe and a lower die shoe, the top shoe being reciprocable relative to the die shoe. The wheel hub is placed in the die shoe and the top shoe caused to descend thereon to cause an expansible head on the upper shoe to expand within the hub and also cause slides containing punches to press against the hub to form the bubbles therein.

On the drawings:

Figure 1 is a side view of the press of the invention showing the die in position.

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

Figure 3 is a sectional enlarged detailed view through the die showing the parts in their position after the top shoe has descended.

Figure 4 is a view similar to Figure 3 but with the top shoe separated from the lower shoe.

Figure 5 is plan view on the line 5—5 of Figures 3 and 4 with parts broken away better to illustrate the structure.

Figure 6 is a perspective view of one of the punch holding slides.

Figure 7 is a perspective view of one of the segments of the expandible head.

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 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 plate 34 mounted on a piston rod 28 connected to a piston operating in an air 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.

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 shoe 26 comprises the relatively flat bottom portion 50 and the annular top portion 52 rigidly secured together by means of the machine bolts 54. The pressure pins 36 extend through openings 56 in the bottom plate 50 and at their upper ends are pressed against the bottom of the slide holder 38. Suitable guide rods 60 are secured to the portion 62 of the annular portion 52 and are received in the bearings 64 in the top die to guide the top die on to the lower die.

The ring member 52 has the ten flattened portions 66 at its interior periphery (see Figure 5) and against each flattened portion there is secured a cam block 68. The blocks are secured in position by means of suitable machine bolts (not shown) passing from the outside of the ring 52 into the blocks. Each cam block has

an inclined inner face 70 in which there is formed the T-slot 72. In the T-slot 72 there is received the T-head 74 of the punch holders 76, shown in perspective in Figure 6. Each punch holder 76 has a rib or projection 78 on its bottom portion which slides in grooves 80 formed in the upper portion of the slide holder 38. A retaining ring 82, forming a portion of the slide holder fits over the slides 76 and is secured to the bottom portion of the slide holder 38 by means of the machine bolts 84. Sufficient space is allowed between the ring 82 and the bottom portion of the slide holder to permit of an easy sliding of the punch holders 76. The bottom portion of the slide holder 38 has the extension or flange 86 which cooperates with the sliding surface 88 formed jointly on the bottom plate member 50 and the upper ring member 52 of the die shoes 26. A projection or flange 90 extending from the top inner portion of the ring member 52 cooperates with the flange 86 to limit the upward movement of the slide holder 38. Slide holder 38 is constantly urged toward the position shown in Figure 4 by the pressure pins 36.

The punch holder 76 is made to the shape shown in Figure 6. Between the adjacent punch holders, a suitable space 92 is provided to accommodate the machine bolts 84. Each punch holder is provided with the rectangular openings 94 to accommodate the shanks of the punches 96. Each punch holder accommodates two punches arranged in different planes and having different shaped ends 98 to form two bubbles the sides of which have a different inclination. The reason for this is that the spokes are not all positioned precisely the same and the ends of the two punches 98 therefore form differently inclined bubbles. The punches are held in place by means of set screws 100 threaded into openings 102 in the punch holder.

The hub shell is indicated at 104 and has the short spoke openings 106 punched therein and countersunk. A locator 108 positioned at a suitable point on the ring 82 has a spring 110 housed in the passage 112 therein and urging a head 114 toward the hub. The head 114 is adapted to fit into one of the openings 106 and definitely positions the hub so that the bubbles 116 (Figure 3) will be properly positioned for the long spokes.

A block 118 is secured by means of the machine bolts 120 to the central portion 122 of the lower flat member 50 of the die shoe 26. The block 118 has the central opening enlarged as at 124 at its bottom portion and has secured therein the head 126 of a cam 128 in the form of a bolt. The cam bolt 128 has the upper cam surface 130 and the lower cam surface 132. Immediately below the cam surface 132 the cam is provided with the ribs 134 defining the spaces 136 therebetween. The purpose of the ribs 134 and spaces 136 is to guide the segments 138 (Figure 7) of the expandible head 140 fixed to the top shoe 24.

The top shoe 24 has secured thereto by means of the machine bolts 142 the ring member 144. The ring member has the central opening 146 and the plurality of recesses 148 in its bottom portion. Housed in the recesses 148 are the coil springs 150 which press against a pin 152 rigidly mounted in the top of each segment 138. A rib 154 on the top of each segment 138 fits in the corresponding groove in the ring member 144 properly to guide the segments.

Each segment has a flange or extension 156 at its upper portion which fits over an annular flange or extension 158 on a guide ring 160. The guiding ring 160 is secured in place by the retaining ring 162 secured to the ring member 144 by means of the machine bolts 164. The retainer ring 162 has the downwardly extending annular flange 166 which strikes against the plate 82 when the top shoe descends to press the slide guide 38 downwardly. A suitable cut-out portion 168 is provided in the flange 166 to accommodate the locator 108. A second series of coil springs 170 fitting in recesses 172 formed in the interior periphery of the guiding ring 160 press plungers 174 against the segments 138. The springs 150 and 170 constantly urge the segments 138 inwardly or to the position shown in Figure 4. Each segment 138 has the hardened wear member 176 at its lower outer portion secured in place by means of the machine bolts 178. The wear resisting member 176 has a suitably shaped surface 180 at its outer portion to accommodate the punches 96 to form the bubble 116 in the wheel hub 104.

The inner portion of each segment 138 has the lower cam surface 182 and the upper cam surface 184 which cooperate respectively with the cam surfaces 132 and 130 of the cam 128. When the cam surfaces come in contact with each other they will cause the segments 138 of the head 140 to expand from the position shown in Figure 4 to that shown in Figure 3. When the surface 182 of the segments leaves the surface 132 of the cam the inner rib portion 186 of the segments 138 will ride in the grooves 136 between the ribs 134, or will dwell until they reach the position shown in Figure 3.

The operation of the machine is a follows: Considering first, the position of the parts in Figure 4, the operator places a wheel hub 104 in the lower die shoe 26 and then moves the handle 40, Figure 1, to throw in the clutch to cause the machine to operate. The machine will cause the plunger 22 to reciprocate once when the clutch will again be thrown out. The downward movement of the top shoe 24 will bring the parts from the position in Figure 4 to that shown in Figure 3. The descent of the shoe 24 will bring the cam surfaces 182 and 132 and 184 and 130 in contact at the same time and will cause the segments to expand as shown in Figure 3, and dwell from the time they leave the cam surfaces 130 and 132 until they reach the position shown in Figure 3. A further downward movement will cause the annular flange 166 to push downward on the plate 82 to press the slide holder 38 downward against the tension of the pressure pins 36 and carry therewith the punch holders 76. The movement of the T-head 74 of the punch holder 76 in the inclined T-slot 72 will cause the punch holders 76 to move inwardly to cause the punches 96 to punch the bubbles 116 in the hub 104. When the head 24 raises the pressure pins 36 will push the slide holder upwardly and the T-head connection 72, 74 will pull the punch holders backward to the position shown in Figure 4. The operator will now remove the hub 104 and insert a new one.

We claim:

1. In a machine for forming bubbles in the hub of a wire wheel, a die shoe including an upper annular portion, a plurality of cam members mounted in said die shoe, a punch holder slide mounted for slidable movement in said

die shoe, a plurality of punch holders slidable in said slide at right angles thereto, means on said holders to engage said cams, a plurality of punches in said holders to form bubbles in a wheel hub, a top shoe reciprocable relative to the die shoe, an expandible head on said top shoe, a cam on said die shoe acting to spread the head into the hub, the downward movement of said top shoe causing the downward movement of said slide and bringing the cam into engagement with the expandible head to expand the same, said downward movement also causing the cam members to act to push the punch holders inward toward the hub to form bubbles therein.

2. In a machine for simultaneously forming bubbles around the periphery of the hub of a wire wheel, a top shoe, a die shoe, said top shoe reciprocable relative to the die shoe, means on the top shoe expandible to back the wheel hub on the inside, said means movable radially only relative to said top shoe, means on the die shoe to form bubbles in the hub when the top shoe is reciprocated, and a cam projecting from the die shoe, said top shoe when reciprocated passing over and embracing said cam to cause the expansion of said first named means against the inside of the hub.

3. In a machine for forming bubbles in the hub of a wire wheel, a reciprocable top shoe, a head on said shoe comprising a plurality of expandible segments movable radially only relative to said shoe, a lower stationary die shoe separate from the top shoe, a cam on said die shoe, said cam engaging said segments when the top shoe is reciprocated to cause the segments to expand inside the hub and rigidly press thereagainst, a plurality of punches slidably mounted in the die shoe to move to and from the hub, and means to cause the punches to move toward the hub to form bubbles when the top shoe is reciprocated relative to the die shoe, said segments and punches contacting opposite sides of the hub when the punches are operated.

4. In a machine for simultaneously forming bubbles around the periphery of the hub of a wire wheel, a top shoe, a die shoe, said top shoe being reciprocable relative to the die shoe, means on the top shoe expandible to back the wheel hub on the inside, said means movable radially only relative to said top shoe, means on the die shoe to form bubbles in the hub when the top shoe is reciprocated, and means on the die shoe to cause the expansion of said first-named means when the top shoe is reciprocated.

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