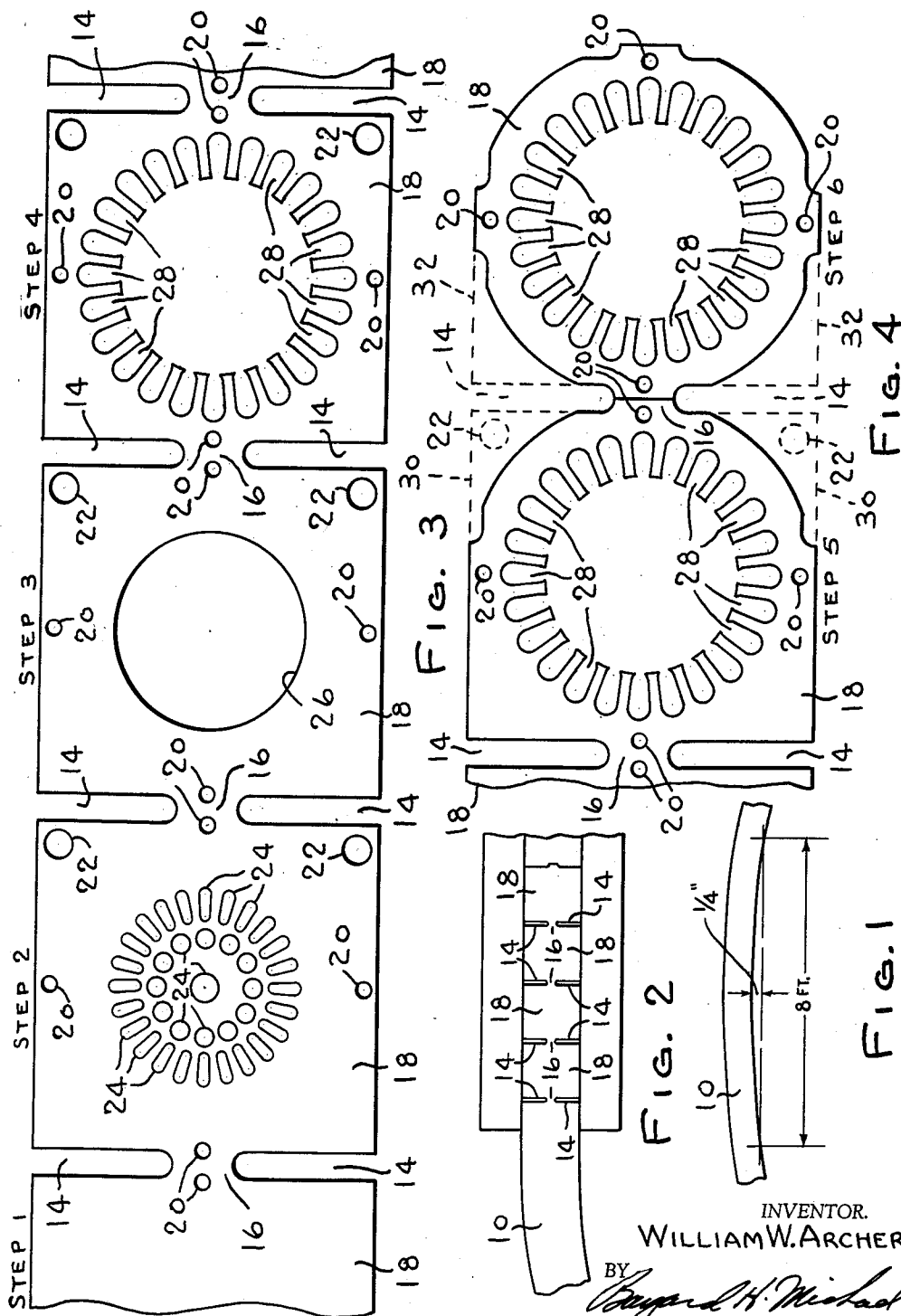


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METHOD OF PREVENTING BINDING OF STRIP MATERIAL
IN A PROGRESSIVE TYPE DIE
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METHOD OF PREVENTING BINDING OF STRIP MATERIAL IN A PROGRESSIVE TYPE DIE

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3 Claims. (Cl. 83—33)

This invention relates to a method for maintaining proper alignment of coil stock at successive steps in a multiple step die and particularly for preventing binding within the die as the stock is advanced therethrough.

Progressive type dies require from two to as many as ten stations in which the stamping operations are to be completed. It is essential that the stock be properly aligned at each successive die station in order to assure that all diameters and dimensions are punched within allowable limitations. Die pilot pins are provided at each successive station to align the stock at that station. Because an overall clearance of approximately ten one-thousandths of an inch is allowed between the high limit of the material width and the two rows of pilot guides in the die, any curvature or camber in the stock will cause serious binding between the guides and the pins with the end result that the stock is difficult to feed and the product is not within dimensional tolerance.

Slitting mills provide coil stock with a certain amount of camber up to a maximum limit of one-quarter inch in eight feet of length which increases the problem of binding in progressive type dies. In as much as this is in excess of the above requirement, stock which is supplied with the maximum amount of camber is practically unusable. This has been a problem facing the industry for some time without any solution, and the slitting mills have so far been unable to reduce the camber to within practical limits.

The primary object of this invention, therefore, is to provide a method for preventing binding of cambered coil stock in progressive type dies.

This object has been achieved by slotting the stock from the edge of the stock toward the center. The slotting operation is completed at the first station of the die between each blank as the material is fed into the die. A narrow neck of stock is then left between the blanks to flex or bend so the pilot pins at each station can properly align the stock for punching to produce the finished stamping.

Other objects and advantages will be apparent from the specification and claims as will obvious modifications of the drawings, in which:

FIG. 1 shows maximum allowable camber in material supplied by slitting mills;

FIG. 2 shows the stock slotted as fed into the die;

FIG. 3 shows the progressive cutting steps made by the die;

FIG. 4 shows the final cutting steps.

Camber is a term applied only to the width of the coil stock and is a condition of edge curvature as viewed upon the top surface of the material. The condition may occur in continuous or serpentine manner and is detrimental to proper feeding through the many stations in progressive

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type dies. As seen in FIG. 1, maximum allowable camber in coil stock 10 supplied by slitting mills is one-quarter inch per eight feet of length. If this material is fed into a progressive type die it will bind between the guide posts and the pilot pins provided in the die so that the diameters and dimensions will not be punched within allowable limitations.

In the drawings, the punching operations are shown with respect to laminations for motors. As seen in FIG. 2, slots 14 are cut into each side of the coil stock as it is fed into the die to allow the stock to flex or bend at connecting necks 16. The slots are cut between successive lamination blanks 18 to keep the stock in a single strip for easier feeding through the die while allowing for a certain amount of bending between blanks to compensate for any camber which may exist in the stock. It can be seen that even where the camber is serpentine the stock will straighten out when fed through the die.

In FIGS. 3 and 4 the progressive stamping steps are shown for a typical die operation. At step 1 slots 14 are punched out leaving neck 16 connecting blanks 18. Simultaneous with this operation four pilot guide holes 20 are punched which are aligned with guide pins to guide the stock through the die. At step 2 pilot pin holes 22 are punched so that at each successive step the blank will be aligned on pilot pins for the next punching operation. In step 2 perforations 24 are also punched along with the pilot pin holes. The stock is then advanced one step by the guide pins until pilot pin holes are aligned with the pilot pins at step 3 where the rotor and first stator blanks are punched out leaving centrally located hole 26. The stock is again advanced until the pilot pin holes are aligned with the pilot pins at step 4 where stator slots 28 are punched out. In step 5 corners 30 are removed and at step 6 corners 32 are removed and the final stator lamination 34 is cut off from neck 16. The guide pin holes used to move the stock through the die may be used to align the blanks when they are assembled for use. It will be noted that only the neck 16 connects the blanks as they are moved through the die so that any misalignment due to camber will be compensated for by the flexibility of the neck.

This solution has resulted in a greatly improved final product and has insured smooth feeding of coil stock. Furthermore, the suppliers of coil stock have been relieved from the problem of attempting to reduce the amount of camber to assure better operation of progressive type dies.

Although only one embodiment of the invention is shown and described, it will be apparent to those skilled in the art that changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A method of preventing binding of a strip of cambered coil stock in a progressive type die comprising: feeding a strip of coil stock into a die, slotting said stock at the first station of the die to form a lamination blank connected to the strip by a neck of material substantially narrower than the width of the coil stock,

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punching at least two pilot pin holes in said lamination at each side of the strip, progressively advancing said strip through the die, and aligning said lamination in the successive stations of the die by pilot pin means which engages said pilot pin holes thereby bending said neck to compensate for any camber of said coil stock.

2. A method according to claim 1 wherein guide holes are punched in said coil stock and said stock is advanced through the die by guide pins engaging said guide holes.

3. A method according to claim 2 wherein said coil stock is slotted at said first station to provide substantially equal slots on both sides of said coil stock.

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