Dec. 2, 1924. 1,517,693

H. P. ARNT ET AL

DIE

Filed July 16, 1921

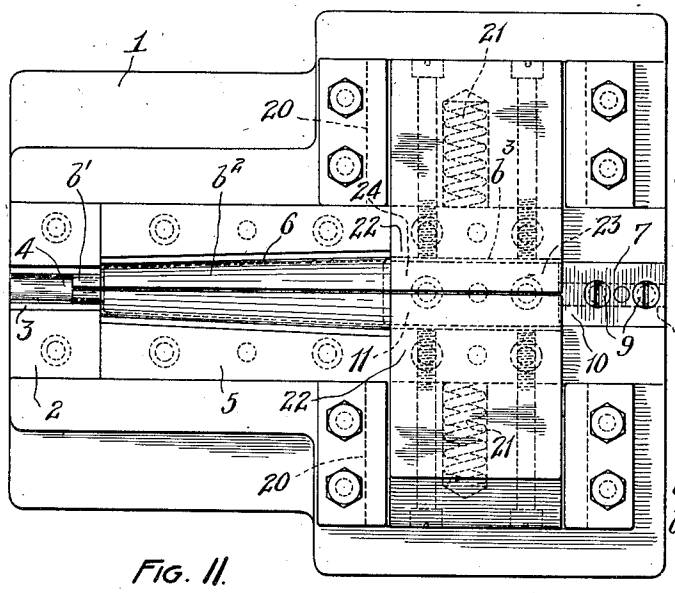


FIG. II.

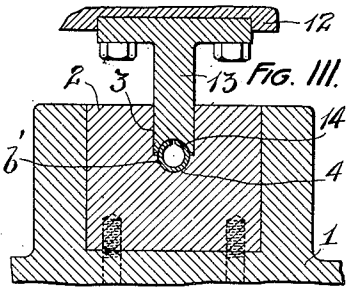


FIG. III.

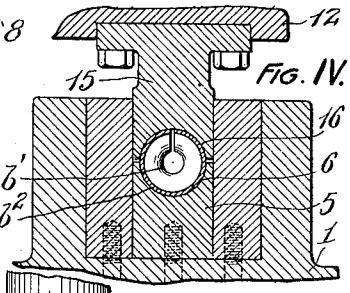


FIG. IV.

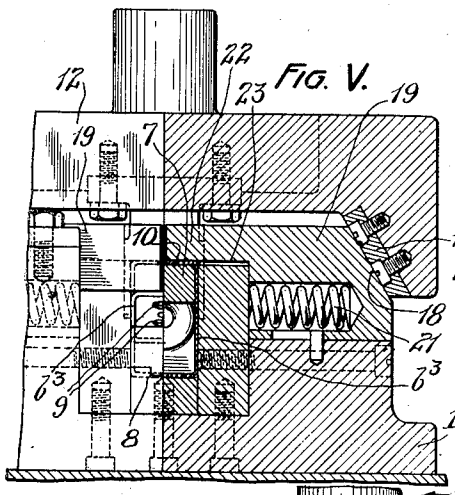


FIG. V.

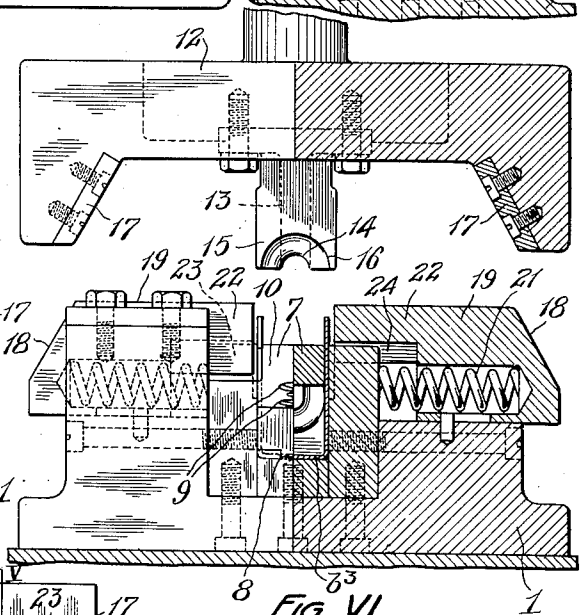


FIG. VI.

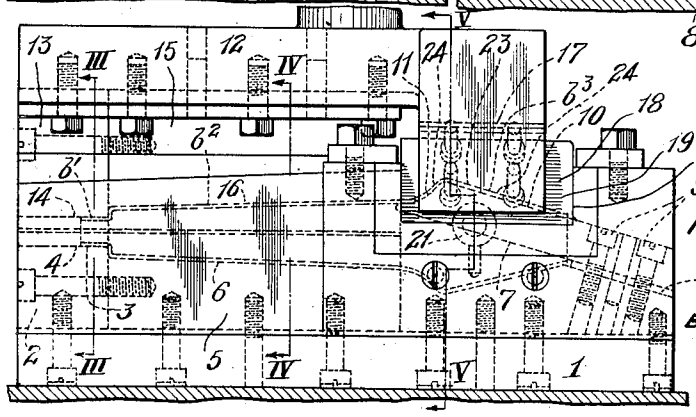


FIG. I.

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UNITED STATES PATENT OFFICE.

HERALD P. ARNT AND THOMAS N. AIKENS, OF LAKEWOOD, OHIO.

DIE.

Application filed July 16, 1921. Serial No. 485,353.

To all whom it may concern:

Be it known that we, HERALD P. ARNT and THOMAS N. AIKENS, citizen of the United States of America and subject of the King of Great Britain, respectively, residing at 1552 Robinwood Avenue and 1564 Wagar Avenue, respectively, city of Lakewood, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Dies, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

Our invention pertains to a final forming die adapted to be employed subsequent to the dies shown described and claimed in our copending applications filed July 16, 1921, Serial Nos. 485,352 and 485,354 respectively.

The object of the die here disclosed is to effect the concluding bending and forming of a hollow wheel spoke resembling as closely as possible the well known and conventional design of a wooden wheel spoke, which prescribes its shape to include an enlarged nave end having one pair of substantially parallel flat sides and another pair of flat sides which converge in a direction toward the near extremity of the spoke.

Referring to the drawings:

Figure I is a side elevation of a die embodying our invention together with a completely formed spoke indicated in dotted lines.

Fig. II is a plan view of our die with the punch removed.

Fig. III is a vertical section on line III—III of Fig. I.

Fig. IV is a vertical section on line IV—IV of Fig. I.

Fig. V is a vertical section taken on zigzag line V—V of Fig. I.

Fig. VI is a view corresponding to Fig. V showing the die open.

A bottom shoe 1 has detachably inserted in it at one end (the left end as viewed in Fig. I) a supporting die 2 fashioned with a cavity 3 the bottom 4 of which is of semi-cylindrical form as appears in Fig. III. The portion 4 of the die cavity is to serve as a rest for the outer end b^1 of a partially formed spoke, that is to say, the end of the spoke which is to be adapted to the felloe. A middle portion of the shoe 1 carries another supporting die 5 fashioned in its upper surface with a conical surfaced cavity 6 of greater size in all dimensions than the cavity 4. The cavity 6 is to be occupied and serve as a rest for the middle section of the partially formed spoke blank b^2.

A mandrel 7 of peculiar formation has a detachable tongue and groove connection at 8 with an upper surface of a block on the right end of the shoe 1 as it appears in Figure I. The mandrel 7 is held in place by cap screws 9, and includes a flat surface 10 downwardly inclined toward the right end as viewed in Fig. I and bounded by a pair of parallel side walls spaced apart a distance corresponding to the distance between the parallel end walls of the partially formed nave end of the spoke as shown in Fig. VI. The top surface 10 of the mandrel terminates at its upper end in an abrupt shoulder formed in conjunction with an oppositely inclined slightly curved surface 11.

As will be readily understood by those who are familiar with this art, the concluding formation may be imparted to concavo-convex blanks, to make them have a circular cross section, without the interpositioning of a mandrel. Accordingly the sections b^1 and b^2 of the spoke blank need not envelop a mandrel but are readily curled to closing position by a punch of appropriate contour to be presently described. However, the nave end of the spoke with its pairs of flat sides requires a mandrel to enable the two sections bordering the seam to be properly and accurately ironed down. When the die is in its open position as shown in Fig. VI the spoke blank may be inserted from the left end of the die as viewed in Fig. I. According to the showing of the drawings, the nave end of the spoke will first be operated upon, but the order in which the sections of the blank which are or are not to be pressed against a mandrel is a matter of arbitrary selection and quite inconsequential to our invention.

A punch holder 12 carries at the insertion end of the spoke a curling punch 13 having its functioning semi-cylindrical surface 14 acting in a well known manner to impart a truly circular form to the section b^1 as appears in Fig. III. Another curling punch 15 provided with an under conical surface 16 is adapted to complete the formation of the

section b^2 as appears in Fig. IV. The punch holder 12 is extended laterally in opposite directions and on two depending extensions thereof detachably carries opposed wearing plates 17 adapted to serve the purpose of cam surfaces in co-operation with similarly spaced beveled surfaces 18 on a pair of reciprocal forming dies 19 bounded for movement between guides 20 and toward each other against the action of springs 21. The punch extremities 22 of the dies 19 are each fashioned on their lower sides with angularly related surfaces 23 and 24 which correspond to the upper surfaces 10 and 11 of the mandrel respectively and as usual are adapted to travel over such surfaces 10 and 11 spaced therefrom substantially the thickness of the blank material. When the dies 19 approach each other they will bend, lay down and iron out the upper extremities of the portions b^3 of the blank. It will be evident from inspection of Fig. VI that when the punch holder 12 is depressed, the cam surfaces 17 presently engage the beveled surfaces 18 to cause the dies 19 to move toward each other. In the meantime, the curling punches 15 and 13 will have come into engagement with the sections b^2 and b^1 in the stated order of succession.

We claim:—

1. A die comprising a shoe, a block detachably carried thereby, and a mandrel detachably carried by said block, said block and mandrel having an interlocking connection along a sloping plane and the mandrel projecting beyond one end of its line of connection.

2. A die comprising the combination of a support, a mandrel carried thereby and fashioned with an inclined surface over said support, a pair of forming dies reciprocable on said support and adapted to approach each other over said inclined mandrel surface, said dies being fashioned each with a beveled surface, and a punch holder fashioned with complementarily beveled surfaces for engagement with the beveled die surfaces.

3. A device of the character described comprising a support having an inclined upper surface and having guides laterally thereof, a mandrel detachably secured to said surface and projecting upwardly beyond the same, a pair of reciprocable forming dies mounted for movement on said guides, said dies being fashioned with beveled lateral ends and with near extremities having inclined lower surfaces adapted to be juxtaposed to the top of the projecting portion of the mandrel, and a punch holder having cam surfaces adapted simultaneously to engage said beveled ends to move said dies toward each other across the top of the mandrel.

Signed by us, this 5th day of July, 1921.

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