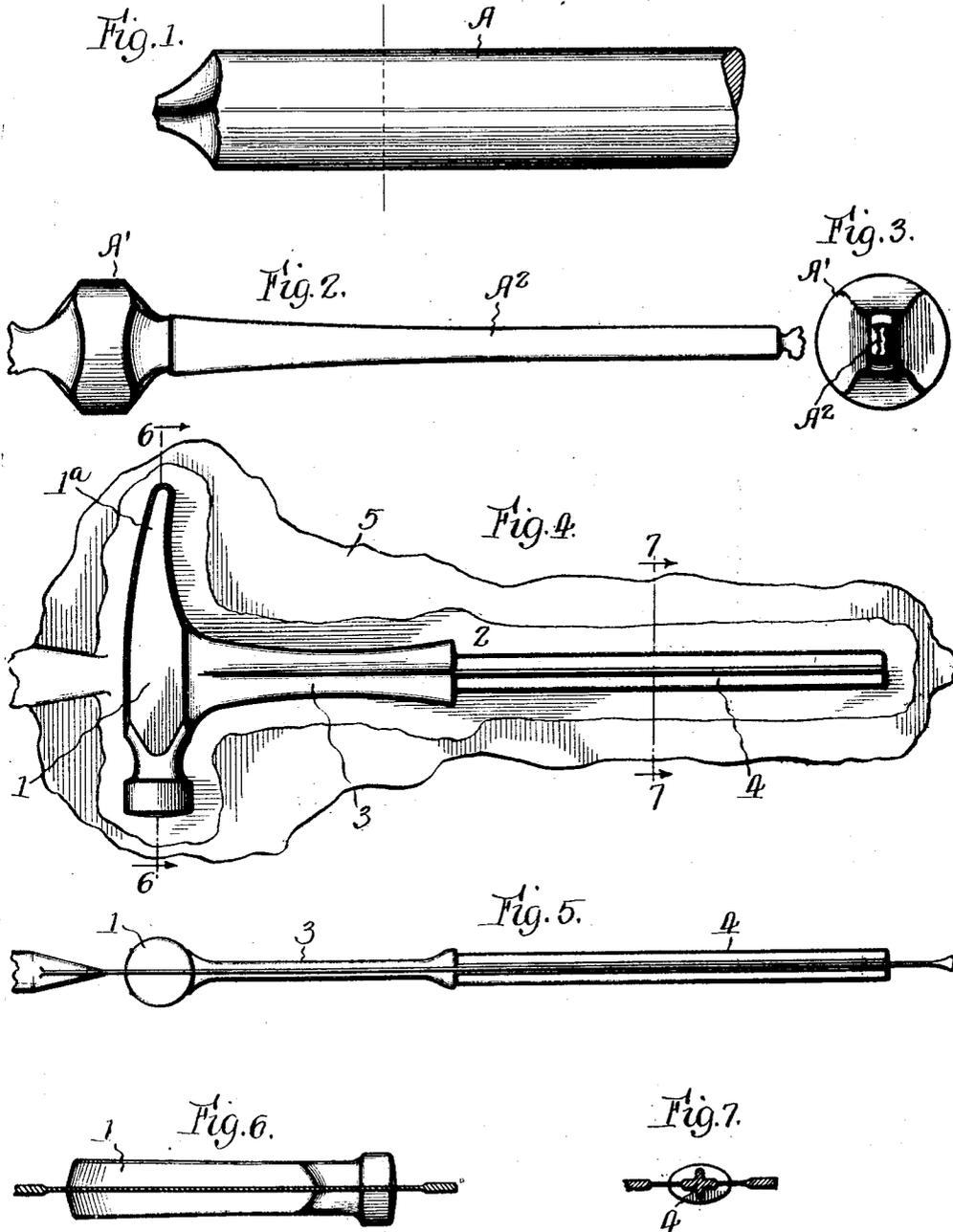


May 15, 1928.

1,669,701

E. O. ESTWING
METHOD OF AND APPARATUS FOR MANUFACTURING NAIL HAMMERS HAVING
INTEGRAL SHANKS
Filed Feb. 5, 1926.

3 Sheets-Sheet 1



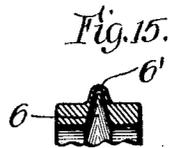
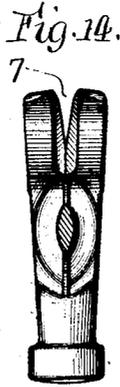
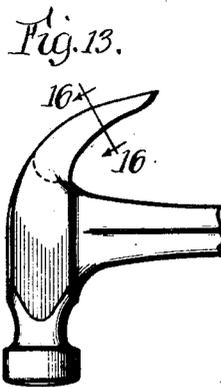
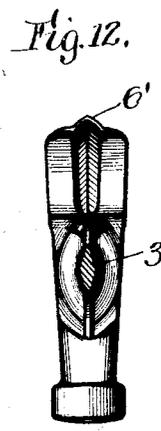
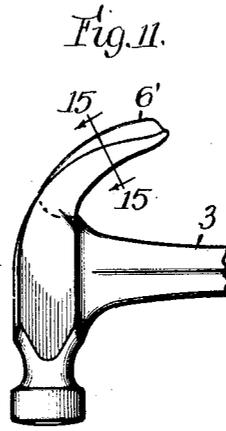
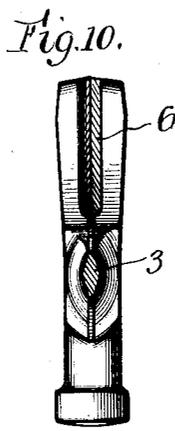
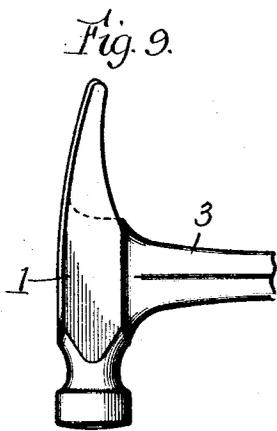
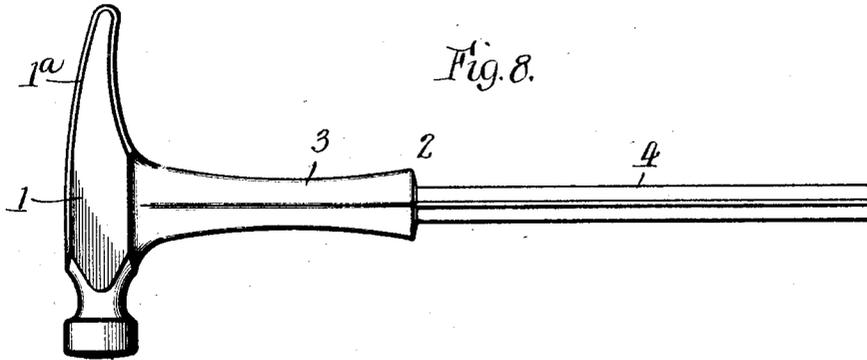
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3 Sheets-Sheet 2



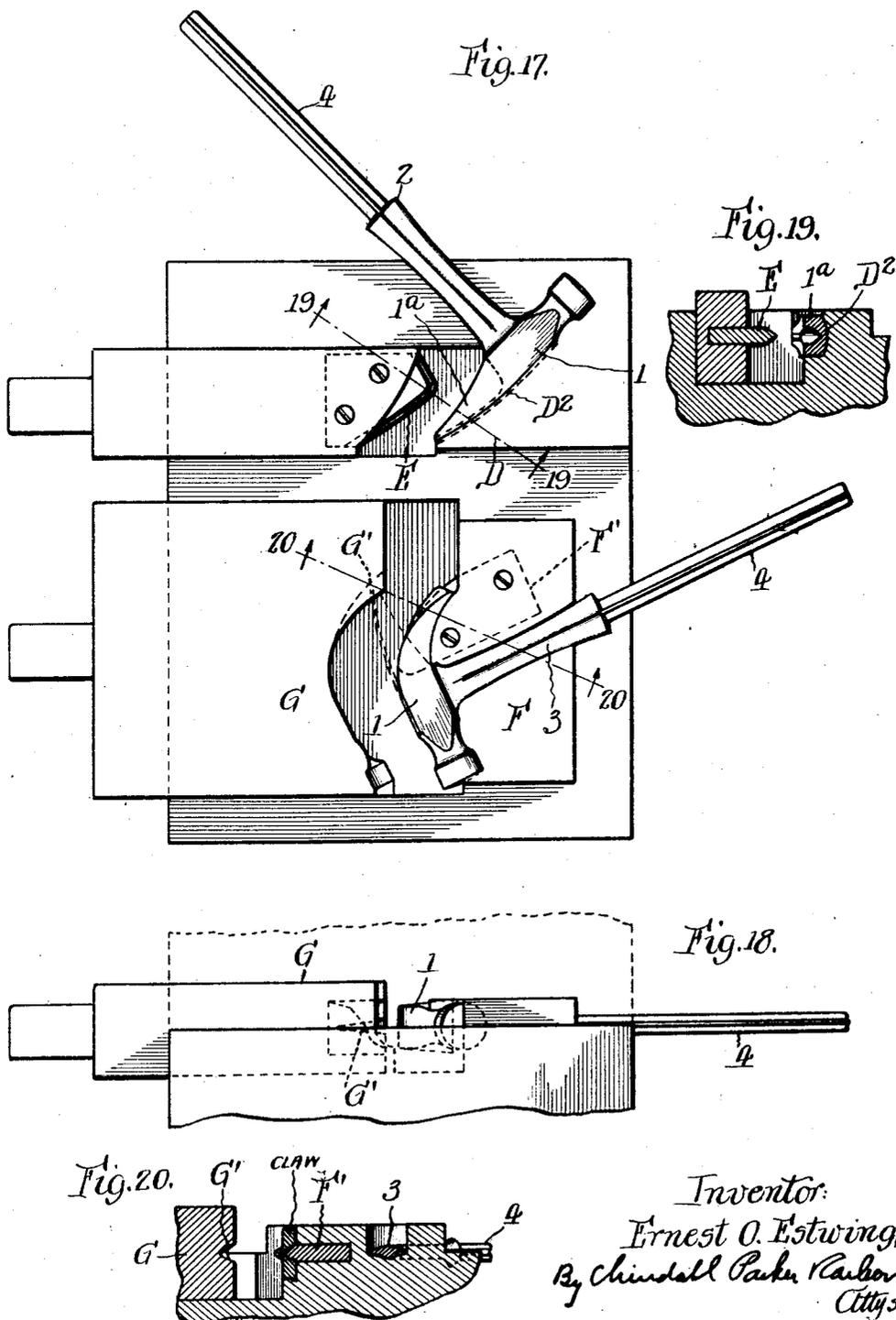
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3 Sheets-Sheet 3



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Patented May 15, 1928.

1,669,701

UNITED STATES PATENT OFFICE.

ERNEST O. ESTWING, OF ROCKFORD, ILLINOIS, ASSIGNOR TO ESTWING MANUFACTURING COMPANY, INC., OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

METHOD OF AND APPARATUS FOR MANUFACTURING NAIL HAMMERS HAVING INTEGRAL SHANKS.

Application filed February 5, 1926. Serial No. 86,201.

The term "nail hammer" is herein used to denote a hammer having a head provided at one end with a striking surface and at the other end with a split claw close to the handle to provide the proper leverage for pulling nails. It is common practice to forge nail hammer heads which are adapted for mounting upon wooden handles, but it has not heretofore been possible to forge a nail hammer having a head which is integral with a shank constituting the handle. The object of the present invention, therefore, is to provide a method of and an apparatus for forging a nail hammer having a head which is integral with the handle shank.

In the accompanying drawings, Figure 1 is a fragmental view of a bar constituting the stock from which hammers may be forged.

Fig. 2 is a view of a portion of said bar roughly forged into condition to be placed between forging dies.

Fig. 3 is an end view of the forging shown in Fig. 2.

Fig. 4 is a side view of the forging produced by the action of the first set of forging dies.

Fig. 5 is an edge view of said portion.

Fig. 6 is a left hand end view of the forging.

Fig. 7 is a section on line 7—7 of Fig. 4.

Fig. 8 represents the forging shown in Fig. 4 after the fin has been trimmed off.

Fig. 9 is a fragmental view of the hammer after the head thereof has been subjected to the action of a die adapted to split the claw.

Fig. 10 is a view looking from the right hand side of Fig. 9.

Fig. 11 illustrates the next step in the operation of forming the claw.

Fig. 12 is a view looking from the right hand side of Fig. 11.

Fig. 13 illustrates the next step in the operation of forming the claw.

Fig. 14 is a view taken from the right hand side of Fig. 13.

Fig. 15 is a section on line 15—15 of Fig. 11.

Fig. 16 is a section on line 16—16 of Fig. 13.

Fig. 17 is a plan view illustrating the dies used in producing the claw.

Fig. 18 is a side view of the dies shown in the lower portion of Fig. 17.

Figs. 19 and 20 are sectional views taken in the planes of lines 19—19 and 20—20, respectively, of Fig. 17.

The hammers are forged from any suitable material as, for example, a round steel bar A, the portion required in the production of one hammer being indicated at the left-hand side of the dotted line in Fig. 1. The end of the bar A is forged between dies into the form represented in Fig. 2 to produce a portion A' destined to become the hammer head and an elongated portion A² which is to become the handle shank. The portion A² is approximately as long as the finished shank.

The forging shown in Fig. 2 is forged between dies to produce the nail hammer head 1 comprising a claw blank 1^a, and a handle shank 2 comprising a neck 3 adjacent to the head and the portion 4 to receive the grip (not shown). As indicated in Fig. 5, the portion 3 is relatively thin when measured transversely to the plane of the head and is sufficiently wide when measured in the plane of the head to provide the necessary rigidity and strength, the neck 3 being thus especially well adapted to resist the stresses that arise in driving and pulling nails, without being so heavy as to destroy the proper balance of the tool.

The portion 4 of the handle shank may be of any suitable cross-sectional form, but is preferably cruciform in cross-section as illustrated in Fig. 7.

The surplus metal that forms the flash or fin 5 is trimmed off, thus producing the forging shown in Fig. 8.

The next operation is the grooving or partial splitting of the nail-pulling claw. In producing the claw, the forging is placed in the apparatus illustrated in Fig. 17, wherein D denotes a die adapted to receive the forging shown in Fig. 8. As indicated in Fig. 19 the die D comprises a surface D² conforming to the shape of the front side of the hammer head. Above the die D is a die (not shown) which overlies the hammer head. Said dies provide space for lateral expansion of the claw blank 1^a when said portion is engaged by the splitting die.

The splitting or grooving die is shown at E. It is mounted for movement in the plane of the hammer head but in a direction which is at an acute angle to the handle shank 2.

The impact of the die E against the middle of the rear side of the claw blank produces a groove 6 (Figs. 10 and 15) and spreads the two portions of the claw apart somewhat, as shown by a comparison of Figs. 6 and 10. The groove 6 is made as deep as practicable.

The claw blank having been thus split and widened, the forging is placed in engagement with a die F which conforms to the final shape to be imparted to the rear side of the head. Said die comprises a blade F' having a rounded edge adapted to project into the groove 6. Coacting with the die F and the blade F' is a die G conforming to the final shape to be given to the forward side of the head and adapted to bend the claw into contact with the adjacent portion of the die F and the blade F'. The die G has a groove G' therein to accommodate a concavo-convex web 6' which is formed from the bottom of the groove 6 when the claw is forced onto the blade F' by the bending die G. In the operation of the bending die G the upper end of the concavo-convex web 6' sometimes breaks open to form a wedge-shaped slot. The die G exerts pressure against the forward side of the claw blank in a direction at an obtuse angle to the handle shank.

All of the operations thus far described are preferably carried out in such quick succession that reheating is unnecessary.

The next operation is the grinding away of the web 6' to produce a wedge-shaped slot 7 (Fig. 14) in the claw. The hammer head and the neck 3 are then ready to be ground smooth and polished.

It will be seen that by the method herein disclosed, I am enabled to forge a nail hammer which has a head integral with the handle shank, the slot in the claw having sharp edges, as required in a high grade nail hammer.

I claim as my invention:

1. The method of forming a nail hammer having a head and a handle shank integral with the head which comprises the following steps, first, forging a heated piece of metal to form a portion destined to become a hammer head and an elongated portion which is to become a handle shank, second, forging the first mentioned portion to form a hammer head having a claw blank, and forging the second mentioned portion to form the handle shank, third, trimming off the flash surrounding said head and handle shank, fourth, forging a groove in said claw blank and simultaneously spreading the portions of said blank at opposite sides of the groove by exerting pressure against the middle of the rear side of the claw blank in a direction at an acute angle to the handle shank, fifth, bending the claw blank by exerting pressure against the forward side of

the claw blank in a direction at an obtuse angle to the handle shank and simultaneously forcing the bottom wall of the groove into the form of a concavo-convex web, and, sixth, removing said web to form a wedge-shaped slot in the claw.

2. The method of forming a nail hammer having a head and a handle shank integral with the head which comprises the following steps, first, forging a heated piece of metal to form a portion destined to become a hammer head and an elongated portion which is to become a handle shank, second, forging the first mentioned portion to form a hammer head having a claw blank, and forging the second mentioned portion to form the handle shank, third, trimming off the flash surrounding said head and handle shank, fourth, forging a groove in said claw blank and simultaneously spreading the portions of said blanks at opposite sides of the groove by exerting pressure against the middle of the rear side of the claw blank, and fifth, bending the claw blank by exerting pressure against the forward side of the claw blank.

3. The method of forming a nail hammer having a head and a handle shank integral with the head which comprises the following steps, first, forging a heated piece of metal to form a portion destined to become a hammer head and an elongated portion which is to become a handle shank, second, forging the first mentioned portion to form a hammer head having a claw blank, and forging the second mentioned portion to form the handle shank, third, trimming off the flash surrounding said head and handle shank, fourth, forging a groove in said claw blank and simultaneously spreading the portions of said blank at opposite sides of the groove by exerting pressure against the middle of the rear side of the claw blank in a direction at an acute angle to the handle shank, fifth, bending the claw blank and simultaneously forcing the bottom wall of the groove into the form of a concavo-convex web, and sixth, removing said web to form a wedge-shaped slot in the claw.

4. The method of forming a nail hammer having a head and a handle shank integral with the head which comprises the following steps, first, forging a heated piece of metal to form a portion destined to become a hammer head and an elongated portion which is to become a handle shank, second, forging the first mentioned portion to form a hammer head having a claw blank, and forging the second mentioned portion to form the handle shank, third, trimming off the flash surrounding said head and handle shank, fourth, forging a groove in said claw blank and simultaneously spreading the portions of said blank at opposite sides of the groove, fifth, bending the claw blank and simultaneously forcing the bottom wall of

the groove into the form of a concavo-convex web, and, sixth, removing said web to form a wedge-shaped slot in the claw.

5 5. Apparatus for use in forming the claw of a nail hammer having a handle shank integral therewith, said apparatus comprising two dies between which the hammer head is placed, one of said dies being adapted to form a groove in the middle of the rear side 10 of the claw blank, the last mentioned die being arranged to reciprocate in a direction which is at an acute angle to the handle shank.

15 6. Apparatus for use in completing the formation of the claw of a nail hammer having a handle shank integral therewith, said claw having a groove in its rear side, said apparatus comprising two dies between which the hammer head is placed, one of 20 said dies conforming to the final shape to be imparted to the rear side of the claw, said die comprising a blade having a rounded edge adapted to project into said groove, the other die conforming to the final shape to 25 be given to the forward side of the claw and adapted to bend the claw into contact

with the first die, the second die having a groove to accommodate a concavo-convex web formed from the bottom of the groove in the claw when the claw is forced onto said 30 blade.

7. The method of forming a nail hammer having a head and a handle shank integral with the head which comprises the following operations, forging a heated piece of 35 metal to form a portion destined to become a hammer head and an elongated portion which is to become a handle shank, forging the first mentioned portion to form a hammer head having a claw blank and forging 40 the second mentioned portion to form the handle shank, trimming off the flash surrounding said head and handle shank, forging a groove in said claw blank and spreading the portions of said blank at opposite 45 sides of the groove, and bending the claw blank by exerting pressure against the forward side of the claw blank.

In testimony whereof, I have hereunto affixed my signature.

ERNEST O. ESTWING.