Sept. 24, 1940. J. A. RICE 2,216,049

NAIL MACHINE AND NAIL MANUFACTURING

Filed Dec. 14, 1937 3 Sheets-Sheet 1

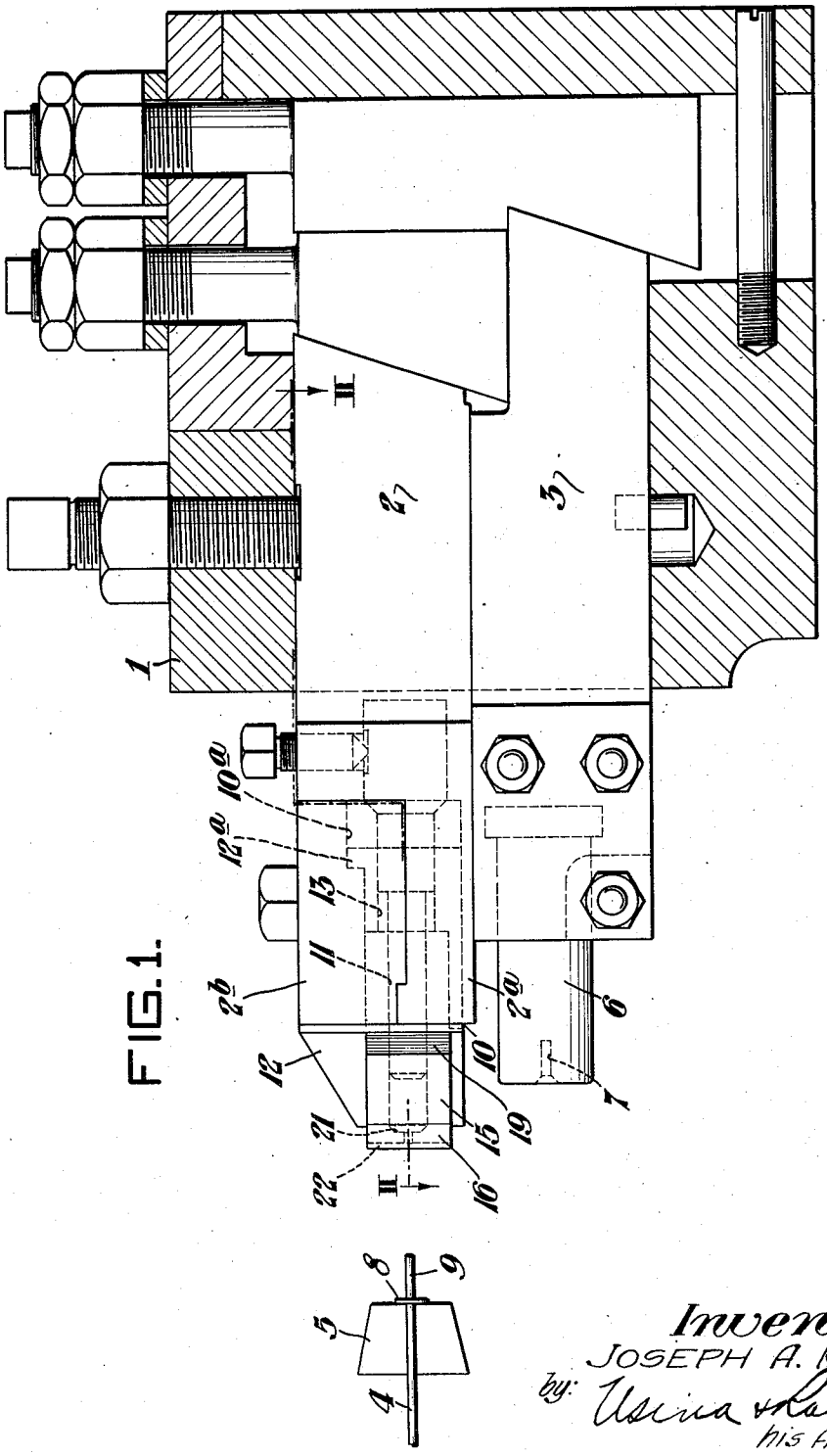


FIG. 1.

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FIG. 2.

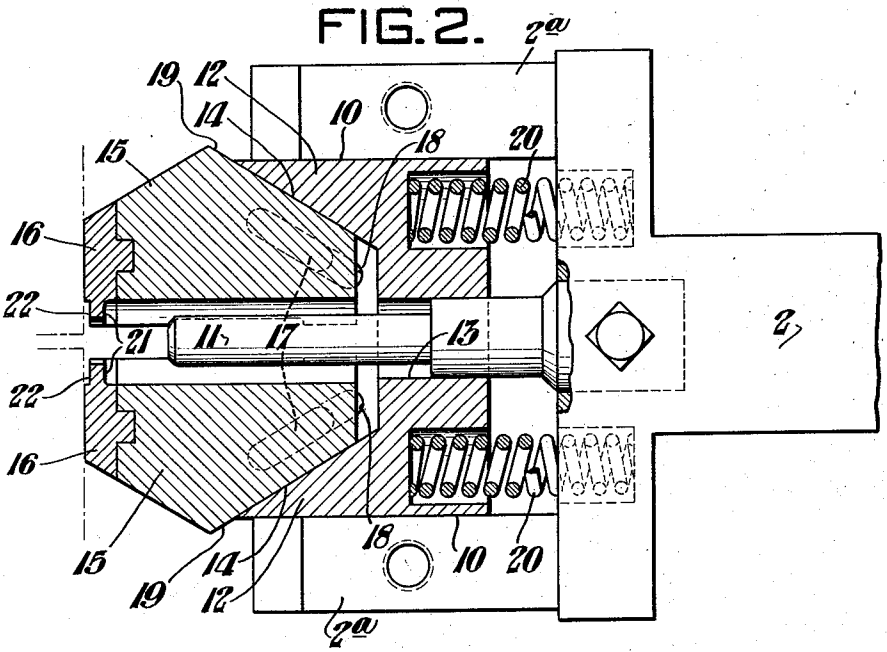
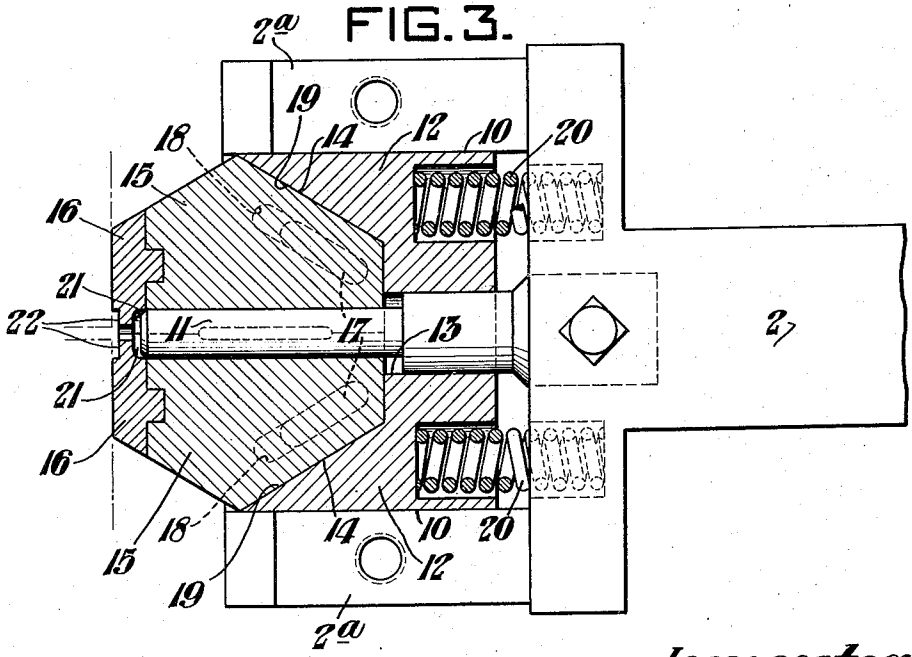


FIG. 3.



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FIG. 4.

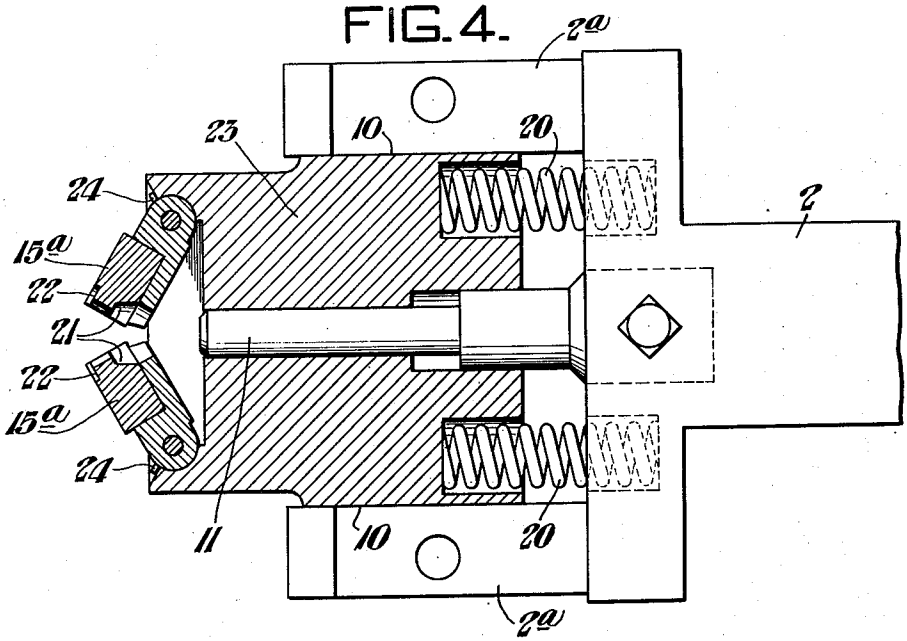
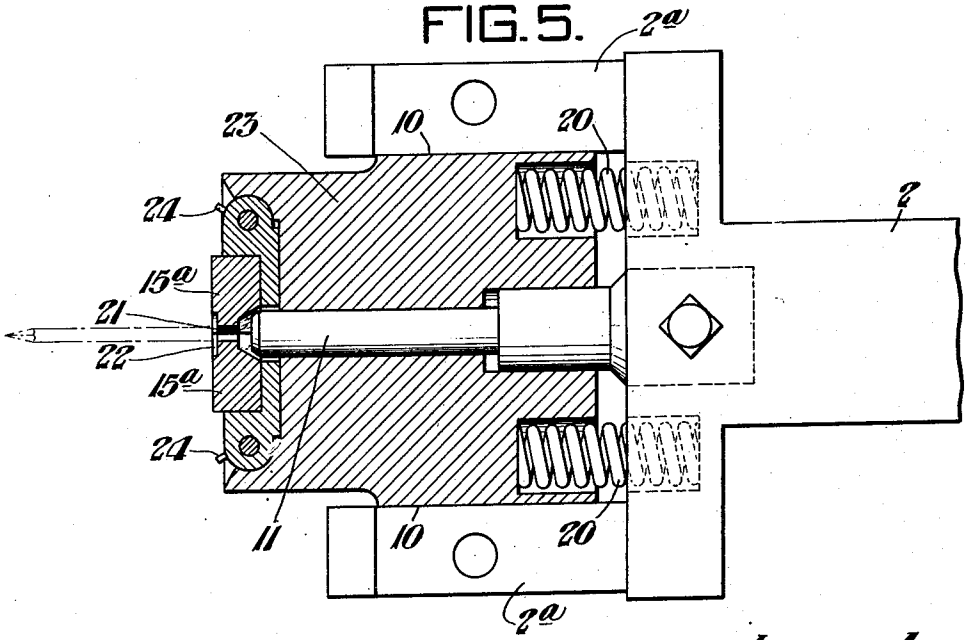


FIG. 5.



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UNITED STATES PATENT OFFICE

2,216,049

NAIL MACHINE AND NAIL MANUFACTURING

Joseph A. Rice, Belle Vernon, Pa., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application December 14, 1937, Serial No. 179,747

8 Claims. (Cl. 10—43)

This invention relates to the manufacture of double-headed nails.

A specific example of the invention, in a form suitable for application to a double-blow nail machine, is disclosed by the accompanying drawings, the various figures being as follows:

Figure 1 is a section of the machine's cross-head mounting hammer stocks, one of the latter embodying the principles of the invention in the form of a special hammer assembly.

Figures 2 and 3 are similar sections showing this hammer assembly, Figure 3 showing it as it appears during operation and Figure 2 showing it as it appears at all other times.

Figures 4 and 5 are similar sections showing a hammer assembly embodying the principles of the invention in a modified form, Figure 5 showing the assembly as it appears during operation and Figure 4 showing it as it appears at all other times.

A complete double-blow nail machine is not disclosed because its construction may follow the prior art. The reader unfamiliar with such machines may refer to Patent No. 1,491,027, granted on April 22, 1924, to Edwin H. Broden.

The drawings illustrate the usual cross-head 1 mounting hammer-stocks 2 and 3 which provide mountings for hammers alternately working wire 4 intermittently fed through the usual pinch-dies 5. The hammer-stock 3 mounts a hammer 6, in the end of which is a hole 7 of slightly larger diameter than the wire 4 and a depth equal to the length of the wire required to form the top head and the shank between this head and the bottom head of a double-headed nail.

When the cross-head 1 registers the hammer 6 with the die 5, the lower head 8 is formed, this leaving a projection 9 from which to form the top head and the shank between the two heads. Subsequently the cross-head 1 shifts a hammer carried by the hammer-stock 2 into registration with the die 5 to effect the formation of the top head.

The hammer-stock 2 is part of what may be termed a hammer assembly which includes the stock, the latter having a trough-like projection 2^a over which a cap 2^b is bolted, these parts providing a guideway 10 extending longitudinally from the stock. The stock also mounts an elongated hammer 11 of relatively small diameter which projects from the stock longitudinally through and beyond the guideway 10 toward the die 5.

A reciprocating clamp housing 12 is retained in the guideway 10 by way of an upstanding lip 12^a working in a confining recess 10^a formed in the guideway cap 2^b. This housing 12 has a bore 13 through which the hammer 11 can work, and a flared opening 14, the hammer 11 projecting centrally through this opening. Nail shank clamps 15 are reciprocatively retained in the opening 14, and have clamping jaws 16 projecting toward the die 5 beyond and on either side of the hammer 11. These clamps 15 comprise separate parts retained in the opening 14 by lugs 17 sliding in cam recesses 18 opening into the opening 14 from the top of the bottom wall of the housing 12, bounding this opening, the clamps 15 having surfaces 19 tapered to the same angle as the flare of the opening 14, and the recesses 18 being in the form of slots extending parallel these flared and tapered parts.

Reciprocation of the clamps 15 respecting the housing 12 obviously effects their clamping and unclamping, and reciprocation of the housing 12 with respect to the hammer-stock 2 permits the hammer 11 to strike and upset the end of the nail shank 9 when it is clamped by the clamping jaws 16. Compression springs 20 are interposed within the guideway 10 between the housing 12 and the hammer-stock 2, whereby the housing 12 is constantly urged outwardly away from the hammer-stock, this, in turn, urging the clamps 15 in the same direction.

The clamping jaws 16 have their surfaces facing the hammer recesses, as at 21, to provide a nail head-forming die, and their opposite faces recessed, as at 22, to provide a receiving recess for the previously formed head 8. Preferably, the jaws 16 are detachable, as illustrated, and are made of metal having suitable hardness.

Now assuming the hammer 6 has formed the head 8 on the wire 4 leaving the projecting shank 9, the cross-head 1 has dropped to register the hammer assembly, of which the stock 2 is a part, with the pinch-dies 5, and the clamps of this assembly are in their released positions, the operation is as follows:

As the cross-head 1 moves toward the pinch-dies 5 the jaws 16 engage these pinch-dies and the clamps 15 cannot further move forward. As the cross-head continues to move, the clamps ride back within the opening 14 of the housing 12 which is, at this time, still traveling forward with the cross-head under the urge of the compression springs 20. During this time, clamping of the nail shank 9 occurs, the recesses 22 on the front faces of the jaws 16 snugly fitting about the previously formed head 8 at

this time. As the clamps 15 are forced to their complete clamping position the springs 20 start to compress, this permitting relative reciprocation between the housing 12 and the hammer 11 so that the latter, which continues to move forward with the hammer-stock 2, ultimately strikes the projecting end of the wire 4 and upsets it within the die-recesses 21 of the jaws 16. It will be noted that these jaws 16 function practically as a separable die. The thickness of the jaw 16 between the recesses 21 and 22 is made equal to the shank length desired between the two heads, so that shanks of constant length positively result.

As the cross-head 1 begins its return reciprocation, the compression springs 20 push the housing 12 outwardly as far as it can go, at which time it begins to move with the cross-head. The clamps 15 cannot return at this time because their jaws 16 are clamping the nail shank between the two heads but, due to the action of the clamp projections 17 and the housing recess 18, they are quickly forced apart and the jaws now disengage the top head of the nail formed by the action of the hammer 11. At this time the entire assembly is free to complete its return and is in condition for another cycle.

In the modification illustrated by Figures 4 and 5, the parallel moving clamps 15 are replaced by oppositely swinging clamps 15ª positioned to engage the pinch-dies 5 of the nail machine and to be thereby swung into mutual alignment, as shown by Figure 5, whereby to clamp the shank 9. On reverse movement of the hammer stock carrying this assembly, the clamps swing oppositely so as to release the shank. These clamps are pivoted to a clamp mounting 23 retained in the guideway 10 in the same fashion as was the housing 12. The springs 20 are also used. The mounting 23 is, of course, reciprocative, whereby the stock can move further forwardly to properly work the hammer 11 upon complete clamping of the clamps 15ª. The jaws of these clamps may be provided with the same features described in connection with the clamps 15 and their jaws 16. Preferably, they are provided with stops 24 which limit their swinging action and which properly position them for engagement with the pinch-dies.

I claim:

1. A nail machine hammer assembly including a hammer-stock, nail shank clamps reciprocatively carried by said stock and having jaws in position to engage the pinch-dies of a nail machine on either side of a nail shank projecting therefrom, means for urging said clamps away from said stock, means for clamping said clamps and which is operated by reciprocation between said clamps and said stock caused by said clamps engaging said pinch-dies while said stock is advancing theretowards and by said clamps' engagement with the nail shank while said stock is retreating therefrom, and a hammer carried by said stock in position to upset the end of a nail shank clamped by said jaws.

2. A nail machine hammer assembly including a hammer-stock, nail shank clamps reciprocatively carried by said stock and having jaws in position to engage the pinch-dies of a nail machine on either side of a nail shank projecting therefrom, means for urging said clamps away from said stock, means for clamping said clamps and which is operated by reciprocation between said clamps and said stock caused by said clamps engaging said pinch-dies while said stock is advancing theretowards and by said clamps' engagement with the nail shank while said stock is retreating therefrom, and a hammer carried by said stock in position to upset the end of a nail shank clamped by said jaws, proximal portions of the latter being recessed on their surfaces facing said hammer to provide a nail head die.

3. A nail machine hammer-assembly including a hammer stock, nail shank clamps reciprocatively carried by said stock and having jaws in position to engage the pinch-dies of a nail machine on either side of a nail shank projecting therefrom, means for urging said clamps away from said stock, means for clamping said clamps when they move toward said stock and for unclamping them when they move away from the same, and a hammer carried by said stock in position to upset the end of a nail shank clamped by said jaws, proximal portions of the latter being recessed on their surfaces engaging said pinch-dies to accommodate a head previously formed on said shank at a position spaced from its extending end, whereby to form another head and produce a double-headed nail.

4. A nail machine hammer assembly including a hammer-stock, nail shank clamps reciprocatively carried by said stock and having jaws in position to engage the pinch-dies of a nail machine on either side of a nail shank projecting therefrom, means for urging said clamps away from said stock, means for clamping said clamps when they move toward said stock and for unclamping them when they move away from the same, and a hammer carried by said stock in position to upset the end of a nail shank clamped by said jaws, proximal portions of the latter being recessed on their surfaces engaging said pinch-dies to accommodate a head previously formed on said shank at a position spaced from its extending end, whereby to form another head and produce a double-headed nail, proximal portions of said jaws being recessed on their surfaces facing said hammer to provide a nail head die for the second head and the thickness of said jaws between said recess equaling the shank length desired between the two heads.

5. A nail machine hammer assembly including a hammer-stock, a guideway extending longitudinally from said stock, a hammer projecting from said stock longitudinally through and beyond said guideway, a reciprocative clamp housing retained in said guideway and providing a flared opening through which said hammer projects, nail shank clamp reciprocatively retained in said opening with clamping jaws projecting beyond and on either side of said hammer and compression springs between said housing and said stock.

6. A nail machine hammer assembly including a hammer-stock, a guideway extending longitudinally from said stock, a hammer projecting from said stock longitudinally through and beyond said guideway, a reciprocative clamp housing retained in said guideway and providing a flared opening through which said hammer projects, nail shank clamps reciprocatively retained in said opening with clamping jaws projecting beyond and on either side of said hammer and compression springs between said housing and said stock, said clamping jaws having their opposite faces formed with nail head receiving recesses.

7. A nail machine hammer-assembly including a hammer stock, a hammer extending from said stock and means carried by said stock for clamp-

ing the nail shank to be headed by said hammer.

8. A nail machine hammer-assembly including a hammer stock, a hammer extending from said stock and means carried by said stock for clamping the nail shank to be headed by said hammer, said means including oppositely swinging clamps positioned to engage the pinch-dies of the nail machine from which said shank projects upon forward movement of said stock and to be thereby swung into mutual alignment, whereby to clamp said shank, and to be oppositely swung upon reverse movement of said stock, whereby to release said shank, said clamps being pivoted by a member reciprocatively associated with said stock to permit further forward movement of the same to work said hammer upon complete clamping of said clamps.

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