

H. C. H. MUSTAD.
FEEDING MECHANISM FOR FORGES.
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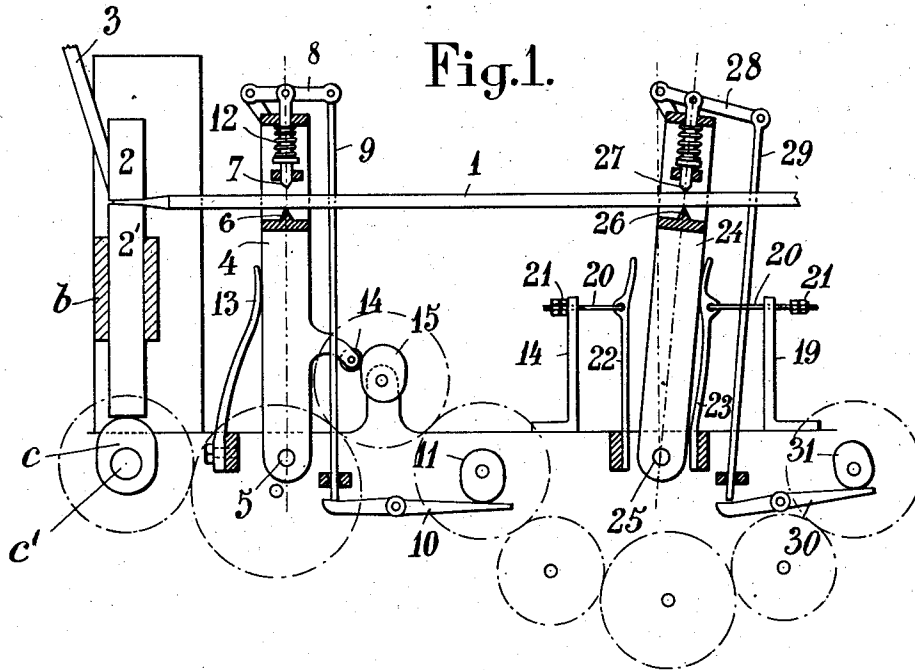


Fig. 2.

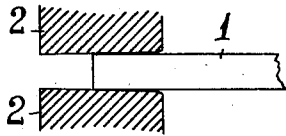


Fig. 3.

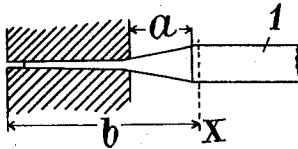


Fig. 4.

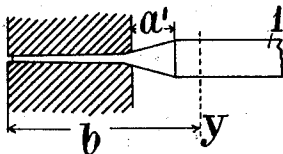
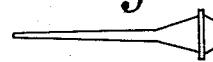


Fig. 5.



Witnesses.

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FEEDING MECHANISM FOR FORGES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HANS CLARIN HOVIND MUSTAD, a subject of the King of Norway, residing at Duclair, Siene-Inférieure, France, have invented certain new and useful Improvements in Feeding Mechanism for Forges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to mechanism for feeding blanks or bars to forging dies.

The action of the dies on a bar or blank, due to the squeezing, causes a backward movement of the bar or blank and the length of this movement varies according to the nature of the metal.

The object of my invention is to provide means whereby each time the dies cause the rod to be pushed backward it is moved forward when released by the dies exactly the same distance that it was pushed backward.

My invention is particularly adapted to the manufacture of horse shoe nails wherein the nails are generally formed by the action of a so-called "four die press" on a rod of square cross section. As is well known this kind of press possess four coöperating dies, which are caused to press laterally on the rod simultaneously from all sides, whereby the squeezing action is attained. By this action of the dies, the shank and the neck portion of the head are simultaneously formed. Thereupon the so formed blank is severed from the rod and the head is by other devices given its final shape. In order to obtain a correctly formed head the amount of material in the head of the severed blank should be the same in every nailblank; the amount of material in the head depends mainly on the distance the rod is fed forward, after each pressing operation. If this distance were the same for every nailblank formed on the end of the rod, it would be easy to secure correctly formed nails; however from reasons stated below this is not the case, and by means of my invention the rod is held and fed forward in such way, that heads of correct size and form may be obtained.

In the accompanying drawing, Figure 1 is a diagram showing the operating parts of

my feeding apparatus and illustrating the manner in which they coöperate. For the sake of facilitating the understanding of the principle of the invention this drawing shows the parts in a simplified form. Figs. 2, 3, 4 and 5 illustrate different steps in the process of forming a nail.

The dies and the mechanism for operating them form no part of my invention. While nails are usually forged in a "four die press" the feeding mechanism forming the subject of the present invention may be employed where only two dies are used. For the sake of simplifying the drawing I have shown a two die press, and illustrated diagrammatically a train of gearing capable of operating the several parts at the proper time.

Referring in detail to the construction illustrated 1 designates an iron bar to be forged, 2 an upper stationary die, 2' a lower movable die and 3 a cutter by means of which the forged end of the rod 1 is severed, said cutter being operated by any suitable well known mechanism. The lower die 2' preferably mounted in a guide *b* and moved into and out of operative position with the die 2 by means of a cam *c* mounted beneath the die 2' on a shaft *c'* which is rotated by a cog-wheel, which constitutes one of the gears of a train of gearing indicated in dotted lines.

The rod 1 to be operated upon, rests in a carrier or feeder, which in the drawing is shown in the form of an arm 4, adapted to swing on a pivot 5, but said feeder may have any other form, commonly used in machines of the character referred to. In the feeder the rod, rests between jaws 6 and 7, the former of which is stationary with respect to the carrier while the jaw 7 is capable of a vertical movement, it being hung on a lever 8, which carries a rod 9 resting on one arm of a lever 10 the other arm of which is controlled by a cam wheel 11, which is rotated by the gearing. The jaw 7 is pressed toward the jaw 6 by means of a spring 12. The feeder is pressed away from the presser dies by means of a spring 13 and thereby a roller 14 on the feeder is held in contact with a cam 15, which is also rotated by the gearing. The cam-wheels 11 and 15 are so formed and the rotation of them so timed by means of the gearing that the rod 1 will at correct intervals be gripped by the jaws 6 and 7 and fed forward to

bring the blank on the end of the rod in position to be severed, and thereupon to bring the rod in position between the dies to be acted upon by them in the way desired.

5 At the beginning of the pressing operation the rod 1 will have a position between the dies about as shown in Fig. 2, and the action of the dies on the bar is illustrated in Fig. 3. It will be seen that the iron is
10 caused to recede from the dies the distance marked a and experience has shown that the distance a greatly varies according to the nature of the iron rod which in some places is less hard than in others and which also
15 differs in sectional area. The action of the dies, owing to these differences, sometimes will result in producing a neck like the one shown in Fig. 3 and sometimes in a neck as shown in Fig. 4. During the pressing operation the rod must be free to move back-
20 ward, and the jaws 6, 7, are either open during this period or the feeder is allowed to recede.

The rod is to be brought forward again, but as the motion of the feeder is controlled by the cam 15, the feeder is not capable of bringing the rod forward, a variable distance, and the result would be a misformed head. For instance, if the machine is regulated for having the nails severed at x Fig. 3, the feeder will, when the severing is to take place, have to carry the rod forward the distance b . If now the next nailblank formed by the dies obtains the form shown
35 in Fig. 4 and the feeder carries the rod forward the same distance b as it did in Fig. 3 the severing line will be at y . When a nail blank like the one so obtained is treated in a head forming press of any approved construction, the result will be, that the
40 head obtains the form indicated in Fig. 5; there being more material in the crown of the head than is necessary to fill the head form and the surplus material is being
45 squeezed out between the parts of the form.

By my invention, I provide means, whereby each time the presser dies cause the rod to be pushed backward on account of the squeezing action of the dies, this movement
50 of the rod is taken up by a member capable of following the rod freely a shorter or longer distance and of returning it again exactly the same distance. This member carrying the rod forward the variable distance necessary for making up the receding
55 movement of the rod during the pressing operation, the feeder itself has only to bring the rod forward a constant distance dependent on the form and size of the head.
60 To accomplish this, I combine the feeder proper with an auxiliary feeder, or holder in the form of an arm 24, pivoted at 25 and provided with jaws 26, 27, and jaw controlling mechanism 28, 29, 30, 31, like that of
65 the feeder proper being operated at the

proper moment by means of the gearing. This holder is kept normally in a central position by two springs 22, 23, pressing in opposite directions on the arm. When the rod is held between the jaws of the holder
70 24 and the rod pressed rearwardly by the action of the dies, the holder will be pushed against the pressure of the spring 23 to the position shown in the drawing; now the presser dies are caused to let go their hold
75 on the rod and it is allowed to go forward again, the spring 23 pressing the holder 24 back to its central position. As will be seen both springs are by means of a distance rod 20 with an adjustable stop 21 connected with
80 standards 19, so that in the central position of the rod neither of the springs will exert any pressure on the holder, and it will therefore always automatically return to this central position. When the rod has been
85 carried forward by the holder 24, the distance it receded during the pressing operation, the jaws 26, 27 are opened by the action of cam 31 on lever 30 and simultaneously the jaws 6 and 7 of the arm 4 are
90 closed by the cam 11 releasing the lever 10 whereupon this arm is positively moved by the cam-wheel 15 the distance necessary for the cutting operation and the pressing operation to follow.
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I claim:

1. The combination with forging dies, of a feeding device adapted to grip a rod to be forged and moved in one direction by the expansion of said rod during the forging, and means to return the feeding device to its normal position after the forging. 100
2. The combination with forging dies, of a main feeding device, and an auxiliary feeding device adapted to be moved in one direction by the action of the dies on a bar being forged, and means to automatically return the auxiliary feed device to its normal position after the operation of the dies. 105
3. The combination with forging dies, of a main feeding device embodying a gripping mechanism, an auxiliary feeding device embodying a gripping mechanism and adapted to be moved in one direction by the action of a bar being forged, means to return the auxiliary feeding device to its normal position after the operation of the dies, and means to operate the gripping mechanism of the main feeding device after the return of the auxiliary feeding device. 120
4. The combination with forging dies, of a main feeding device embodying a gripping mechanism, an auxiliary feeding device embodying a gripping mechanism and adapted to be moved in one direction by the action of a bar being forged, means to return the auxiliary feeding device to its normal position after the operation of the dies, means to operate the gripping mechanism of the main feeding device after the return 130

of the auxiliary feeding device, and means to operate the main feeding device simultaneously with the operation of its gripping mechanism.

5 5. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, means to return the auxiliary carrier and its gripping mechanism to its normal position after the operation of the dies, and means to operate the auxiliary gripping mechanism when in its normal position.

6. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, means to return the auxiliary carrier and its gripping mechanism after the operation of the dies, means to operate the auxiliary gripping mechanism when in its normal position, and means to actuate the main gripping mechanism after the operation of the auxiliary gripping mechanism.

7. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, means to move the auxiliary carrier toward the dies after the operation of the latter, means to operate the main gripping mechanism after the movement of the auxiliary carrier toward the dies, and means to move the carrier toward the dies after the operation of its gripping mechanism.

8. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, a spring engaging the auxiliary carrier adapted to move it toward the dies after the operation of the latter, means to operate the main gripping mechanism after the movement of the auxiliary carrier toward the dies, means to move the main

carrier toward the dies, means to operate the gripping mechanism of the auxiliary carrier to release the rod, and a spring engaging the auxiliary carrier, adapted to move it from the dies to its normal position.

9. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, a spring engaging the auxiliary carrier adapted to move it toward the dies after the operation of the latter, means to operate the main gripping mechanism after the movement of the auxiliary carrier toward the dies, means to move the main carrier toward the dies, means to operate the gripping mechanism of the auxiliary carrier to release the rod, a spring engaging the auxiliary carrier adapted to move it from the dies to its normal position, and means to regulate the movements of the springs in one direction.

10. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, a spring on each side of the auxiliary carrier pressing thereon in opposite directions to yieldingly hold the latter in its normal central position.

11. The combination with a plurality of forging dies, of a main carrier, gripping mechanism thereon, an auxiliary carrier and gripping mechanism on the latter adapted to be moved away from the dies by the expansion of a bar caused by the action of the dies thereon, a spring on each side of the auxiliary carrier, pressing thereon in opposite directions to yieldingly hold the latter in its normal central position, and an adjustable rod connected to each spring to control the movement of the latter in one direction.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HANS CLARIN HOVIND MUSTAD.

Witnesses:

FIMBEL EMILE,
MAURICE D'ANJOU.